

NATIONAL INFRASTRUCTURE COUNCIL ACT OF 1990

HEARING BEFORE THE SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION, AND INFRASTRUCTURE OF THE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE ONE HUNDRED FIRST CONGRESS

SECOND SESSION

ON

S. 2046

A BILL TO ESTABLISH A NATIONAL INFRASTRUCTURE COUNCIL, AND
FOR RELATED PURPOSES

JULY 17, 1990

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NATIONAL INFRASTRUCTURE COUNCIL ACT OF 1990

TUESDAY, JULY 17, 1990

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON WATER RESOURCES,
TRANSPORTATION, AND INFRASTRUCTURE,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:05 a.m., in room 406, Dirksen Senate Office Building, Hon. Daniel P. Moynihan (chairman of the subcommittee) presiding.

Present: Senators Moynihan, Durenberger, Reid, and Warner.

OPENING STATEMENT OF HON. DANIEL PATRICK MOYNIHAN, U.S. SENATOR FROM THE STATE OF NEW YORK

Senator MOYNIHAN. I call to order the hearing of the Subcommittee on Water Resources, Transportation, and Infrastructure. We are here to discuss the Senate Bill S. 2046, the National Infrastructure Council Act. This is a measure which has been introduced by our Chairman, Mr. Burdick, and co-sponsored by just a whole range of us on the Committee, including my dear friend and colleague, Senator Reid.

The measure as Mr. Burdick envisions it is basically an extension of the Public Works Improvement Act of 1984, in which this Committee created the National Council on Public Works Improvement. I think you know its work. It continued for four years. In 1988 it produced the report, *Fragile Foundations*, which said America's infrastructure is very adequate to fill current requirements, and insufficient to meet demands of future economic growth.

That report in other circumstances might have brought forth a response from the Administration. It did not, saving for some thoughtful comments on transportation earlier this year, for the simple reason that infrastructure costs money and the Government has none.

We have been for almost a decade now pursuing what was basically a policy of insolvency and it is beginning to show in many ways. It shows in this. Our Committee—my friends Mr. Reid, Mr. Lautenberg, Mr. Durenberger, might note—all this talk about magnetic levitation we've had here, hours, weeks of hearings, and the State of New York, with no comment at all, has gone ahead with a \$100 million program. What is so unusual about that? We can't do these things. We decided that we can't, and we don't.

The idea of an infrastructure council is basically to establish a locus inside the Executive Branch so that a case can be made for doing what needs to be done and so that some alternatives between modes can be thought out, so that a strategy of financing can be thought out. We have heard from Mr. Dan Flatigan, who I see is here, with some very intriguing notions about how what we do might be carried out by a financing structure that would have a lot of leverage and get things done.

Still what Hamilton called "energy in the Executive" is notably missing. We will not be surprised if the Administration comes here to tell us not to do this. But there is no point in taking more time being told not to do it than necessary.

I do also believe I see Ms. Nancy Rutledge coming into the room. She, of course, was the very able director of the program of the National Council on Public Works Improvement, which I mentioned earlier on.

Senator Reid, good morning, sir.

OPENING STATEMENT OF HON. HARRY REID, U.S. SENATOR FROM THE STATE OF NEVADA

Senator REID. Mr. Chairman, thank you for leading the charge on problems of the infrastructure generally and specifically this legislation.

S. 2046 is not complicated legislation. Basically, it will improve the ability of the Federal system to service the needs of State and local governments on infrastructure matters. It clearly focuses infrastructure information and assistance into a central repository and will improve the decision making process at, really, all levels of government.

This legislation affords us an important opportunity to insure that a coherent national policy is coordinated among those Federal units responsible for the development, improvement and maintenance of the country's infrastructure. It will also ensure that national infrastructure needs and priorities are set and reviewed on an on-going basis.

In addition to disseminating technical information on elements of the Nation's infrastructure, this bill would provide seed money for the research and development of innovative technologies to provide new solutions for old problems.

Mr. Chairman, this is of particular interest to me. You and I have long been proponents of the use of high speed magnetic levitation, "Maglev." These systems of transportation are American invention and can be used as an alternative to inner-city personal vehicle transportation.

Mr. Chairman, it is inconceivable to me that the State of New York with its myriad problems, as you've indicated, is spending \$100 million. You and I embraced last year after the appropriations bill came out when we got \$1 million. Do you remember that, \$1 million? We have the Administration fighting an effort that I have made to not spend five cents of Federal money, rather to set up a program of guarantees of pension fund monies to be used for research and development. It would not cost us a cent. But that is being opposed, and I can't get it out of committee.

So we hear of crumbling bridges, inadequate highway capacity to meet demands, and that is an understatement, areas still in need of basic waste and water treatment facilities, impacts of flood and severe storms, and stressed airport and rail systems.

I met yesterday, Mr. Chairman, with the head of the O'Hare Airport. This woman is now probably the most dynamic person in America today on the needs for airports and the inadequacies of airports, Mary Rose Lawney.

What they are talking about doing in Chicago, now, is spending \$5 billion to build another airport. I am saying that there are better ways to spend money. We are trying to do the same thing over and over again. We need to try something different.

Certainly as competition increases for scarce resources, we recognize that more will have to be done with less. An inadequate infrastructure reflects problems in providing for public health and safety and environmental protection. These are day-to-day quality of life issues that clearly warrant our attention. We need to be innovative in our solutions and equitable in responding to the real needs of local communities.

We in Nevada are frustrated with increasing pollution problems resulting in part from a rapidly growing population. Even though we in Nevada do not have the problems that other places have, we are still frustrated. I can imagine what people in other parts of the country must feel.

These activities that attract visitors from all points around the Nation and the world do affect Nevada. The sooner we deal with alternate means for transportation on heavily used traffic corridors, the sooner the quality of our lives will improve.

Mr. Chairman, what we are talking about in Nevada is that we are now having traffic problems between the Los Angeles area, southern California, and southern Nevada in the Las Vegas area. The freeway, Interstate 15, at times is jammed, especially when everyone is wanting to leave Las Vegas at the same time to get back to California. We are actually looking into the cost of adding a lane of traffic each way on the freeway, between Las Vegas and Los Angeles. The cost of that is about \$350 million.

Again, we are trying to solve modern day problems in old fashioned ways. We need to start looking at new ways to solve some of the problems. That is what this legislation is all about.

We have a coordinated opportunity that Federal agencies can be involved in coordinating policy to solve the myriad problems that we have in our infrastructure. This basically is what this hearing, I hope, will address.

The Nation's infrastructure is not someone else's problem. It is our problem at every level of government, State, local, and Federal. It can no longer be taken for granted.

I congratulate Senator Burdick, and especially you, Mr. Chairman, for your leadership and foresight in addressing the problems of a decaying infrastructure. This is one that calls for the implementation of American innovation, an example again is Maglev. That is our invention.

The only bidder to build the Maglev system between Las Vegas and Los Angeles was a German company, the only one to bid on it. The bids just came in last week. The only company is a German

company. They are going to be using American technology. They are going to be building it in Germany, shipping it over to Las Vegas and Los Angeles to haul Americans back and forth. That is too bad.

Senator MOYNIHAN. That is this age. In fact, if I could just make a point before turning to Senator Durenberger, we began the discussion of Maglev in the context of just how many more lanes could we add to the interstate highway system indefinitely? Or, could we say that there is obviously an optimum moment after which it is a disutility to add another lane of highway between Miami and Orlando. They were estimating 44 by the year 2000.

Senator REID. Yes, 22 each way.

Senator MOYNIHAN. Yes. And Russell Baker ran a wonderful column titled "One of our States is missing". It was like a terse BBC announcement of World War II.

We will be able to fund those two lanes on the interstate between Las Vegas and Los Angeles, because that system was put in place under President Eisenhower. The interstate system is there and the funding is there. But what we will not be able to do is move to an alternative mode because when civilizations begin to recede they can't innovate. However, fortunately, the Germans and the Japanese are there. I can say that the Japanese have evidently decided to make a major investment in Professor Kohl's company, which is a variation on the original research financed by the Federal Government, which was two-pronged. The Japanese have offered him, I understand, quite staggering sums. Once again, we will have a product invented in America and made in Japan.

On which subject, I turn to our friend from that site of innovation and progressive government, the great State of Minnesota.

OPENING STATEMENT OF HON. DAVE DURENBERGER, U.S. SENATOR FROM THE STATE OF MINNESOTA

Senator DURENBERGER. Mr. Chairman, thank you.

I come to these hearings for at least two reasons. The first one is because as long as I've been here, you are one of those unique people who can see over the horizon and I just enjoy anticipating what could be out there.

The second is because you spend a fair amount of time, as you and Harry have just illustrated, in talking about the problem up here. I don't know how interesting it is to anybody down here. They may just come prepared to read their five minute statements and go back to their bureaus and do their things. I would hope that they come for the same reasons that I come, just to listen to you talk about what could be.

You made the comment that infrastructure costs money and the Government doesn't have any. That is where we have the problem. I just want to remind folks that need reminding that when we had all kinds of money, we did not spend it on the important parts of infrastructure anyway. In other words, when money was no object, we built, we didn't maintain. We laid last year's design on this year's or tomorrow's problems.

Everybody who has ever come here has testified to us about lack of R&D and all that sort of stuff.

We now know that if you don't have money, you can't innovate, because your maintenance problems become so severe that the infrastructure problem in this country is going to become just like the health problem. All we do is take care of sick people, but we won't spend money on prevention. I think that was your point.

In looking at this, I have just come to the conclusion as you have that it is not a question of money, it is a question of values. All the infrastructure councils in the world are not going to change the Nation's values. Until the Nation's values change, you are not going to do infrastructure. You are not going to do prevention in health care. You are not going to do something sensible about Social Security and health care for the aged or for the young.

I didn't come here to question whether or not any Government structure can help us change our values. I come from a State, as you know, Mr. Chairman, that does innovate. But I must tell you that every time we come up with a better way of doing something, there is a Federal bureaucracy that says, "Well, I'm sorry we can't support that, because the way we operate, it pays to pay for things that actually work, not the innovative things." So then we have to create a separate structure to do innovation. We will commit X number of dollars to experiment with this or demonstrate that, rather than leaving the State or the private sector or somebody else to do our experimentation.

Our colleague, Steve Symms, and I had a hearing on the highway reauthorization in Minnesota. We took some time to look at IVIH systems, the new Guide Star system that they are putting into practice there in the metropolitan area of the Twin Cities. I have come back to my daily commute to Washington, D.C., and I am more angry than I have been for the last 11 years.

What do we do around here? We take park money and other money and build highways. What are they trying to do in metropolitan Twin Cities? They are using television and control centers and a lot of other things to improve the traffic flow, not adding highways to improve the traffic flow, but trying to use technology to improve traffic flow. I sure don't see that around here. All I see around here is signs that say, "Pardon us for the inconvenience. We are trying to lay more concrete, so more of you from Virginia and Maryland can get downtown more quickly." And of course, that is where the money is.

It is not in the innovation. It is not in supporting the Guide Star systems. It is not doing that sort of thing. But that is nothing new.

Mr. Chairman, and Harry, having listened to what you said about Maglev and high-speed rail, which might be more practical than some the situations we are talking about, I am here because you are here, not because I really believe that in the next year or so that creating an Infrastructure Council is going to solve this problem. It really is a matter of values. Until enough people come to these meetings and listen you talk about what could be, I don't know that our value system is going to change.

Anyway, thank you for holding this hearing.

Senator MOYNIHAN. I am going to make one quick comment on what Senator Durenberger said. Yesterday we had a hearing at the Foreign Relations Committee on a subject that has been absorbing me for a long while. That is the obvious fact that for the last 40

years, the Central Intelligence Agency has made massive errors in its estimate in the size and the growth of the Soviet economy.

It starts with the Gazer Commission Report, in 1957 after Sputnik, in which they depicted the Soviet Union as a dynamic industrial economy, roaring ahead at twice the rate of growth of the United States, clearly destined to overtake the United States, as Mr. Khrushchev had declared would happen, and do so in the near term. As late as 1979, the CIA estimated that the investment and the actual rate of savings in the Soviet Union was equal to that of Japan, and more than twice that of the United States.

The official estimate of the agency today is that the Soviet GNP is 51 percent of American GNP. Well, the Chairman of the Council of Economic Advisors came before us yesterday and said that he would be surprised if it was one-third. A trillion dollars is missing from the Soviet economy, a trillion dollars we didn't know about.

Some Soviet academicians have it as low as 14 percent. There is a consensus at about 25 to 30. What did we miss? It is very clear that one of the things we missed is the problems produced by Soviet lack of infrastructure. We get very good estimates, spooky, high-tech assessments of crop yield from satellites. No one could ever believe that is almost a cultural problem. No one would believe that half the Soviet food production spoils in the distribution system. Half. Perhaps two-thirds of the potatoes that are eaten. They don't have roads. They don't have railroads.

Senator Warner, our witnesses have been very patient while we have opined on this subject. We welcome you this morning, sir.

OPENING STATEMENT OF HON. JOHN W. WARNER, U.S. SENATOR FROM THE COMMONWEALTH OF VIRGINIA

Senator WARNER. Mr. Chairman, I have a statement which I will place in the record.

[Senator Warner's statement follows:]

OPENING STATEMENT OF HON. JOHN W. WARNER, U.S. SENATOR FROM THE COMMONWEALTH OF VIRGINIA

Mr. Chairman, I am pleased that the Subcommittee is conducting this hearing on legislation that would establish a National Infrastructure Council.

It has been two years since the National Council on Public Works Improvements issued its final report to the Congress on the status of the Nation's infrastructure. The Council did a fine job of defining the Nation's infrastructure problems. Many of the issues raised by the Council have been overshadowed by the financing needs discussed by the Council. At the time, the Council focused on three other subjects which were important to the national infrastructure policy. Specifically, the Council focused on: policy coordination; information dissemination; and technological innovation. The legislation crafted by Chairman Burdick will establish a permanent Federal Infrastructure Council to address these issues.

This Council would coordinate federal infrastructure policy, set infrastructure priorities, provide technical assistance to states and localities, act as a clearing house of information on infrastructure, and conduct a five-year program to promote technology transfer and innovation.

I think many of my colleagues would agree with me that it is time to take a closer look at the way we prioritize and fund our nation's infrastructure, particularly with respect to our interstate highways. It is also imperative to better coordinate the information and technology available throughout the United States.

The Federal Interstate System, which began in 1956, is nearly complete, and the current highway program is scheduled to end in 1992. Congress needs to take action now to look at the different alternatives which exist to address gridlock on our interstates, both in the short-term and long-term.

During this decade, certain areas throughout Virginia, from Northern Virginia to Tidewater, face tremendous needs in the area of transportation improvements. I am certain similar problems exist in the rest of the country.

For this reason, on February 9, 1989, I introduced S. 410, a bill to help urban and suburban areas of the country cope with increasing levels of traffic congestion on the Federal Interstate System. My legislation is innovative in that in addition to widening interstates where traffic overloads occur daily during peak periods, it also encourages alternatives other than more asphalt, such as better use of mass transit and carpooling.

I see the legislation I proposed during the first session as the beginning of those solutions that Congress must consider closely. For the long term, it is important that we devise a more comprehensive plan to address all our country's surface transportation infrastructure. The legislation being discussed today is necessary in order to coordinate all available resources such that the best possible long-term plan can be subsequently initiated.

The gridlock on our Nation's highways and the deterioration of our infrastructure translates into reduced productivity, lost income, and time and money ill-spent. This Council will provide us with the objective leadership necessary to formulate a new long-term national strategy.

Senator MOYNIHAN. Then we will go forward. First, we have a panel of very distinguished representatives of Government agencies.

We see first of all, Mr. Galen Reser, who is Assistant Secretary for Governmental Affairs of the Department of Transportation.

Mr. Reser, we will hear from you first, then Mr. Davies, then General Kelly. All statements will be put in the record. You go right ahead.

STATEMENT OF GALEN RESER, ASSISTANT SECRETARY FOR GOVERNMENTAL AFFAIRS, DEPARTMENT OF TRANSPORTATION

Mr. RESER. Thank you, Senator, Mr. Chairman. It is a pleasure to be with you here this morning.

I must say that I share Senator Durenberger's comments about, the pleasure of being in your presence. You constantly cause us to think and reflect on any number of things, and I enjoy that immensely.

Let me put my statement in the context of the National Transportation Policy process that the Department undertook last year.

You, Mr. Chairman, were kind enough to come down to the White House when the President unveiled it. It is a process that took us all over this country, focusing on our Nation's infrastructure. We attempted to do what you do here, and that is to listen to the American people.

Without a doubt, it became quite clear that we do have an infrastructure crisis. It has got to be addressed if this country is going to be competitive in the years to come.

We are attempting to do something about that. Let me also say that that process was very helpful from a Departmental standpoint, because it forced our various modes of transportation—you might think that since we are all under the same roof that somehow we are always talking to each other—we found that through this process that that isn't always the case.

Senator MOYNIHAN. You are an accretion of institutions that had a life before the Department of Transportation, and don't necessarily know each other.

Mr. RESER. That is exactly right. We found this process, however, brought us together. We found that there was a cross-fertilization,

regardless of what you think of the final recommendations of our policy report. We, internally, had this tremendous benefit accruing from the cross-fertilization and the intermodal discussions that took place. I think you are going to see the results of that, particularly later this year when we unveil our surface transportation reauthorization proposal, which obviously has to come before this committee.

Of course, earlier this year we also unveiled our Federal aviation package, where we do propose to expand capacity to match the demand in growth that we face right now on the air side. Senator Reid touched on that in terms of the proposed new airport in the Chicago area.

I wanted to touch on the recent passage of Proposition 111 in California, which shows that people are willing to support higher transportation user fees when they know that the money will be targeted to identified needs. Of course there are, and I suspect will be, discussions about what our funding needs will be in the future as we get into the reauthorization process.

Let me touch very briefly, Mr. Chairman, on the legislative proposal before us. You are right and I suppose I will be the one who has to say it, that the Administration does not support the enactment of this legislation.

We would point out, and I brought some examples here for you, that where the bill calls for annual assessment of needs and priorities, that objective is already being met by the various DOT reports and studies, many of which are mandated by Congress, which we put out annually or biannually. I'm thinking here of a report on the status of the Nation's highways and bridges, conditions and performance. We have our National Plan of Integrated Airports Systems, a five-year look at our needs on the air side. So many of these reports are there, the assessments are there. Therefore, we find that S. 2046 in many respects would be duplicative of what is already done. We had a chance to talk about this on Friday.

In addition, the bill charges this Council with developing and coordinating Federal infrastructure policy. Again, we feel this duplicates responsibilities that are given to the Secretary of Transportation and other Executive Branch agencies.

We do have a consultative process, if you will, through the Cabinet and through the Office of Management and Budget. We do meet regularly on issues, whether it be legislative proposals or other issues that come up. I think my colleagues would attest to that.

The bottom line is, as you pointed out, we are here to testify in opposition to the Council.

Having said that, we also want to work with you and this Committee. We are willing to discuss it. We agreed that we would have an open mind today as we listened to the testimony and your comments, sir.

Senator MOYNIHAN. Good. We don't ask more than that. It may be a formal structure would only add yet only another organization to an environment where what is needed is a process that can exist with or without a structure.

Mr. Davies, do you want to speak to that point?

STATEMENT OF J. CLARENCE DAVIES, ASSISTANT ADMINISTRATOR FOR POLICY, PLANNING, AND EVALUATION, ENVIRONMENTAL PROTECTION AGENCY

Mr. DAVIES. Thank you, Mr. Chairman. I will be brief, since I come to the same bottom line conclusion, I'm afraid, as the previous speaker.

Senator MOYNIHAN. Say what you want about the efficiency of the American Government, but when OMB decides to get something, the word gets around.

Mr. DAVIES. I can in all honesty testify that I came to the conclusion even without the assistance of the Office Management and Budget.

Senator REID. That is what they all say.

Senator MOYNIHAN. You are one of a long list, Mr. Davies.

Mr. DAVIES. Let me very quickly make three points. First of all, the Environmental Protection Agency—

Senator MOYNIHAN. We made you sit here and listen to us all morning, so we will listen to you.

Mr. DAVIES. EPA has been concerned about the general topic of infrastructure, both in terms of trying assure that it knows what the needs of the country are in terms of physical investment in environmental control, and also in terms of trying to deal with the pressures and impacts at the State and local level of investment in infrastructure. That has been a significant concern of the Agency. Especially now that we are increasingly in the business of regulating small sources and small communities, we have had been concerned about the cumulative economic impacts of our requirements on small local governments, for example, some of the standards that we have considered with respect to drinking water.

One of the difficulties that we have faced is taking into account whether we will get the necessary degree of compliance at the local level, because the expense may be too great for a small drinking water system.

So we have had, as I say, both the concern in terms of the adequacy of the investments we are making and the problem of what the impacts of those investments will be. We have had a number of studies, a number of groups, and we have a number of ongoing organizational entities within EPA dealing with these kinds of questions.

To turn to the bill directly, I would say two things. First of all, I do think that in terms of coordination—I deal with this in my written testimony—coordination is obviously a good thing per se, but the question is, on what dimension or according to what principle are you coordinating? As you stated a few minutes ago, coordinating the different modes of transportation within the Department of Transportation is not a simple task. I can assure you that we face a somewhat analogous task within EPA, maybe not to the same degree, but in terms of which investments have the highest payoff from the standpoint of improving the environment to the greatest degree. That is a difficult matter to decide. Inevitably it involves coordinating the different parts of EPA.

I would submit that it is difficult, if not logically impossible, to fully coordinate along more than one dimension. In fact, we should

focus our efforts on trying to have a coordinated transportation policy and a coordinated environmental policy, and so forth. While the infrastructure dimension cutting across those is important, it is frankly less important than getting coordination within those sectors. That initial step has got to be the first step.

The third point is that insofar as the council created by the bill would serve the purpose of being an advocate for greater investment in infrastructure, I share the opinions expressed by Senator Durenberger that there is something of a gap between the mechanisms proposed in the legislation and the goals being sought.

I think we can discuss what the reasons are for under-investment in infrastructure or in fact whether that is the case. It may be a lack of dollars. It may be a problem with technology. It may be, as Senator Durenberger suggested, a problem of values, the time horizon that we take on things.

I guess I would really question whether creating a coordinating council will achieve the purpose of bringing about a higher degree of investment in the Nation's infrastructure.

Senator MOYNIHAN. That is a perfectly fair judgment.

Let me ask a question, and let anybody answer. I hope my colleagues will just take the same approach for this. We are having a discussion.

We are now in the process of a conference committee with the House of Representatives on the Clean Air Amendments of 1990. It tells you something about the subject when I say that there are 140 Members of the House on the Conference Committee. We take up the House Caucus Room in the Cannon Office Building.

That is a huge spending bill. It involves an enormous expenditure on infrastructure, the infrastructure of a kind required to meet certain environmental standards. Infrastructure is meant to distinguish modes of production. The productive structure rests on the infrastructure. Just as we are required to have roads, factories, rail transportation, they are also going to have to have scrubbers and other devices in their productive modes in order to be able to do what they are to do, which is to make things or to move things.

How much would you say the Clean Air Act will cost American industry per year?

Mr. DAVIES. Of course, that is a subject that is fraught with dangers. But I believe the current estimate of the Senate bill is about \$21 or \$22 billion, annually.

Senator MOYNIHAN. Let's say we double that and call it \$50 billion. That is about right.

How much of that \$50 billion is required in order to deal with the environmental impact of different modes of transportation?

Mr. DAVIES. Certainly some significant portion.

Senator MOYNIHAN. Call it \$10 billion?

Mr. DAVIES. If you are estimating, certainly 20 percent, let's say, at least that.

Senator MOYNIHAN. That is the interstate highway program, right?

Mr. DAVIES. It sure is.

Senator MOYNIHAN. That is what we spend, \$10 billion a year. EPA is spending \$10 billion a year.

Mr. DAVIES. EPA is causing to be spent. We have to be careful as to what we say.

Senator MOYNIHAN. There you are. You are causing to be spent an amount equal to the largest public works program since the war.

Mr. DAVIES. Except that I think the public sector/private sector distinction is important here, because if one included the various private sector costs that went along with the public investment in the interstate highway system, it is obviously a different kind of program.

Comparing direct Government expenditures on the one hand with a total private/public sector effort on the other is a little unfair.

Senator MOYNIHAN. Just for purposes of discussing the subject I would say we need to be even more careful in this new mode. The Federal Government has no money. We are spending money. Our process is to make other people spend money. It is really just plain easier to spend other people's money than to spend your own.

Mr. DAVIES. I can certainly assure that we do not lightly spend other people's money. As I think you know, the White House and EPA both have made the cost impacts on the private sector of the Clean Air Bill a major focus of attention and concern.

Senator MOYNIHAN. Still, basically, we are spending other people's money. You have to have a much more optimistic view of the species than I do not to think that will be a more casual process than spending your own.

Mr. DAVIES. Well, it is a complex situation because in fact—and my office is just starting a process in order to ascertain this—my own personal view, and it is backed up by a little bit of evidence, is that we consistently overestimate the cost estimates of private sector spending that result from environmental regulation.

Senator MOYNIHAN. Do you?

Mr. DAVIES. Yes. In effect, what happens is that we assume a straight line with no new technology and no flexibility or adjustment ability on the part of the private sector. In those few cases when we have gone back and looked back at what the actual costs have been, they have been lower rather than higher.

Senator MOYNIHAN. Why don't you put you somebody to work on estimating what of the proportional costs, whatever they are, for the Clean Air Act, how much arise from dealing with the consequences of transportation modes? Maybe you can give us an idea of how much you are into Mr. Reser's business, or into General Kelly's business. You can send that over this afternoon, right? [Laughter.]

Mr. DAVIES. It will be an approximation, at least.

Senator MOYNIHAN. Senator Reid might be interested in that Mr. Davies has just agreed to a very rough proposition, that about 20 percent of the cost of the Clean Air Act will arise out of modes of transportation, and their polluting effects and so forth. My estimate of the cost of the bill is about \$50 billion per year. We come up with about \$10 billion per year, which the cost of the Interstate Highway Program. That is EPA.

Mr. DAVIES. It is a bargain.

Senator MOYNIHAN. Well, it is a bargain for us because other people pay for it. We can't resist that.

General Kelly, good morning, sir.

STATEMENT OF MAJ. GEN. PATRICK J. KELLY, DIRECTOR OF CIVIL WORKS, CORPS OF ENGINEERS, DEPARTMENT OF THE ARMY

General KELLY. Good morning, Mr. Chairman, Senator Reid, Senator Durenberger. It is a pleasure to be here to represent the Army and the Corps in discussing the Nation's infrastructure. The Corps of Engineers has been involved for over 215 years in this Nation's infrastructure. As part of our Civil Works Program, we are involved in construction of harbors, waterways, and flood control projects. Our military construction mission, both for the Army and the Air Force world-wide, results in the construction of installations, air bases and their associated infrastructure. This includes housing, roads, airfields, water supply, wastewater treatment plants, and solid waste.

You have Nancy Rutledge coming up in the next panel. She is going to discuss her views and her background as the Director for the National Council on Public Works Improvement. They did a fantastic job, as you have already described, in Fragile Foundations, which laid out a whole agenda.

We were particularly impressed by the approach of instead of just adding up—and I'm sure you will cover that—what the cost of infrastructure is now and where it's going, but the approach that the Council did on laying out a report card, which graded all of us in eight different areas, all the way from hazardous waste through water supply. The highest grade was a "B". I believe the lowest grade was something like a "D-". At least it caught our attention. It was a great way of explaining to the Federal agencies, the Administration, and the public the relative importance of infrastructure now, but more importantly, why it is going to be important later on.

I'll explain a couple of things that we are doing to try to enhance innovative solutions to developing infrastructure areas. As you know just a couple of months ago in May, in coordination with you, the Assistant Secretary of the Army for Civil Works, Bob Page, sponsored a forum right here in this building in which he laid out an initiative with EPA to develop public/private partnerships to address the environmental services of water supply, waste water treatment, and solid waste treatment. I might point out, that our partnership with EPA continues. We and EPA are laying out a program for the next fiscal year to help communities address those particular problems.

I might point out, as you remember, we received enthusiastic response from about 40 different industry leaders, and that effort continues.

In addition to that effort, a year ago within the Corps of Engineers I established an infrastructure task force to begin to look at innovative things that we could do, not only within our missions for flood control and navigation, but also to establish other partnerships with Federal agencies to address infrastructure needs. As a

consequence of that, I might point out, that we submitted, and it was approved by OMB in our fiscal year 1991 budget, \$350,000 to begin coordinating with the other Federal agencies to address infrastructure-type problems and solutions.

We are very enthusiastic that OMB approved our request, which essentially will provide for a forum to discuss infrastructure.

The specifics of the bill, I think have been covered by the other two testifying officers, so I won't go into that. We look, as you know, Mr. Chairman, forward to working with you and your subcommittee on this particular bill because there are many, many portions of this bill that we think have a lot of merit.

Thank you, Mr. Chairman, for hearing our testimony.

Senator MOYNIHAN. General, you know the respect in which you are held by this Committee, and obviously by the United States Army, and it is with no disrespect of any kind, but just plain continued absorption of the subject. Is it the case that there were some years in the 1980s where the Corps of Engineers was carrying out more construction in Saudi Arabia than in the United States?

General KELLY. There was a time in the late 1960s and 1970s when we had a considerable program in Saudi Arabia. I might point out, that also was infrastructure related.

Senator MOYNIHAN. Well, sure, all those water systems.

General KELLY. We were building complete cities.

Senator MOYNIHAN. Building complete cities?

General KELLY. With a mosque or two thrown in.

Senator MOYNIHAN. I don't want to question you, but isn't it the case that you built 87 mosques? You don't have to answer that, General. It seems to me that the Corps of Engineers should do everything once, and probably three times, in order to get the hang of it. If I'd learned that they had to build five mosques, figure all the details out—how to get it sited just right, work out problems in the magnetic poles, and things that, then put it in a case history, put in the files in case you need to have a crash program in mosque building one day—that is fine. But 87 mosques. You seem to have gone into the mosque building business.

Senator REID. A lot of them are small.

Senator MOYNIHAN. How many Presbyterian chapels have you built?

General KELLY. We haven't quite gotten around to that yet.

Senator MOYNIHAN. I think we better avoid this subject. We hear you. I am sure you hear us. It is very clear that you hear us.

I'd like to see if you all talked about the mix of allocation of costs in the Clean Air Act. We might hold a hearing on that next year. See how you feel. I'd like to ask Dr. Davies, who is a very distinguished scholar and a public servant. You were a consultant to the Ash Commission, weren't you, Dr. Davies?

Mr. DAVIES. You have a good memory, sir.

Senator MOYNIHAN. Yes, and good nightmares. You may be finding that you are dealing with the aftermath of events when what your real interest is to deal with the forerunner, the precursors.

What Senator Durenberger said is that we spend a fortune treating disease, when clearly a health system ought to be in the business of seeing that doesn't happen to you in the first place.

Just how much time can you spend cleaning up the air of pollutants produced by automobiles when you really have nothing to say about the number of automobiles that will be in the polluting business?

Mr. DAVIES. Well, we have stressed, and Administrator Reilly has stressed repeatedly over the last year and a half, the importance of pollution prevention and of not just cleaning up.

Senator MOYNIHAN. Oh no, not that is a new idea to you.

Mr. DAVIES. It is one that we are working on very intensively. We are working on it in the same spirit that is intended by your bill here in the sense that we have had discussions with the Department of Transportation.

Senator MOYNIHAN. Our Maglev interest is driven because we just spend our time here more and more dealing with the costs of the increase automobile transportation. You don't catch up that way. We were astounded by the increase of automobiles in the 1980s.

Mr. DAVIES. That is a concern to us.

Senator MOYNIHAN. Senator Reid, I am sorry. Thank you very much for coming up. We understand your position. You understand ours. We are not in conflict here. We are trying to find a way to work at this thing. We are trying to do better.

We appreciate your coming up and I wish you'd thank Mr. Page and Dr. Reilly, and Secretary Skinner. We very much enjoyed having you.

We are in receipt of a statement from Senator Chafee who is unable to attend today's hearing. That will be inserted in the record.

[Senator Chafee's statement follows:]

OPENING STATEMENT OF HON. JOHN H. CHAFEE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Mr. Chairman, I want to join with you in welcoming our witnesses to the hearing today on S. 2046, the "National Infrastructure Council Act of 1990," which was introduced by the distinguished Chairman of this Committee, Senator Burdick.

Infrastructure is important to the economy and standard of living in this country. It is also important to maintain and invest in that infrastructure. In discussing infrastructure in this country, I would include not only highways, bridges, dams, and sewer and water facilities, but also such things as our health care system, educational institutions, and telecommunications system. All of these areas are competing for scarce dollars.

Numerous studies and analyses of the condition of our infrastructure have been done and they indicate that over the long term, all levels of government will have to increase their investment in infrastructure to maintain and provide adequate facilities and services.

S. 2046 proposes one way to address this problem. While the goals of this legislation are admirable and desirable, I am not convinced that it provides the best mechanism to achieve these goals.

S. 2046 creates a new, permanent Infrastructure Council at a cost of \$5 million per year just for staff. It requires the Council to carry out technical assistance, and technology transfer activities, and to encourage innovative technologies related to infrastructure. It also directs the Council to develop and coordinate Federal infrastructure policy. Additional funds are provided for these activities.

These are admirable goals but most, if not all, of them are already being addressed and carried out by the Federal agencies with responsibilities in these areas. At a time of large Federal budget deficits and competing needs, I do not believe we can afford to duplicate efforts or create another layer of bureaucracy with an agenda and turf of its own.

The agencies who would be part of this permanent Infrastructure Council all have extensive staffs and expertise. They are undertaking technical assistance and technology transfer activities as well as research and development. If there are areas where they can share such activities or which would benefit from better coordination, this should be encouraged. I would hope this could be done within existing agency budgets and staff resources.

We in Congress may also have to take some responsibility if there is lack of coordination or other inefficiencies in our infrastructure programs. There is fragmented jurisdiction among many Congressional Committees. There are strong existing programs in each area of infrastructure such as the highway program, the water resources program, and the construction grants program. And Federal, State, and local practices and relationships are strongly tied to these existing programs. Unless there are fundamental changes made in these institutions and policies by policymakers, I believe the Council and its recommendations will have little impact.

Mr. Chairman, these are some of the concerns I have, and I look forward to hearing from our witnesses today.

Senator MOYNIHAN. We are going to hear from some advocates. First of all, as announced, Nancy Rutledge, who was the director of the National Council for Public Works and who is now in private practice. Allen Pierce, who is Vice President and Director of Governmental Relations for the W.R. Grace Corporation and David Bear of the American Society of Civil Engineers. You are also a member of the National Infrastructure Policy Committee.

Good morning to you all. We will proceed as we ordinarily do in order as listed.

Ms. RUTLEDGE, good morning again, and I look forward to hearing from you.

STATEMENT OF NANCY RUTLEDGE CONNERY, FORMER DIRECTOR, NATIONAL COUNCIL FOR PUBLIC WORKS

Ms. RUTLEDGE CONNERY. Good morning, Mr. Chairman, it is a pleasure to be back again.

I would say straight off I come here not to lobby to get my old job back.

When we published *Fragile Foundations* a few years ago, on time and under budget, I was very pleased and proud and relieved. I can tell you that two and a half years later, I am still more relieved than proud.

I have continued my work on infrastructure from a different setting. I look at it now from the standpoint of local government, but with the consultancy that extends beyond Maine, in fact, international as well. I am very much in support of the National Infrastructure Council as proposed.

I was struck earlier this morning by the testimony of Mr. Creser and Mr. Davies regarding the fact that their agencies were essentially doing what this bill suggested already. I don't dispute them. I think their agencies have made great strides in that effort.

I am still struck by the fact that there really isn't any forum by which the interactive effects of their two agencies' policies are negotiated or understood. I can tell you from the standpoint of local government, and I am now married to a local elected official who feels this very keenly, particularly in a small town suffering a lot of growth pressure, that those interactive effects are very real. There is no suitable forum, even at the State level—there is at least some effort at the regional level in the area—but at the State level and most particularly at the Federal level to begin to elimi-

nate those differences between agencies, the things that ultimately undermine the capacity of any given place, any given locality, whatever size it is, to produce good infrastructure, and more importantly to sustain good infrastructure.

It is a system, it is not just a set of structures. I think if I were to look back on my previous work, the one major criticism I would make of it, I am learning what I don't know more than perhaps what I do, is that we did not look at it from the standpoint clearly enough of the impact of all of these structures on creating places—not just civic entities, but places that are comfortable and prosperous to live in.

Again, structures are important. I am concerned about their deterioration and their future and their possibilities.

But I think they are secondarily important to building sustainable communities. Also, the environment is part of that. Also, where we live the natural environment and our built environment are equally important. The balance of those two things was simply beyond the scope of our study at that point.

How those places look and how they operate has as much to do with where you put the infrastructure and how that infrastructure operates than any other factor. I think that was beyond our pale.

I am hopeful that this Infrastructure Council will be as presented in the legislation. I might suggest that you consider seriously adding the Department of Agriculture and the Department of Housing and Urban Development, who do not actually run infrastructure but their policies have a tremendous impact on the demand for infrastructure, which is an important part of that equation.

Senator MOYNIHAN. Water.

Ms. RUTLEDGE CONNERY. Indeed. Also the state and local organizations, the governmental organizations, the elected officials, who must deal with the impacts of Federal policy should be represented officially on this Council in some fashion as well. I look toward that Council being a focal point, a place to press forward our understanding of these issues.

We don't need to do a lot of original research. I think we have a lot of research in place right now. It is a matter of understanding and implementing. It is a matter of negotiating differences, removing obstacles, that are put forth by separate agencies' policies that have unintended effects on localities, detrimental effects, or providing a means of supporting a continuing discussion throughout the country. I miss that. I think that was one of the things our Council did best, was to promote that discussion. It included literally thousands of people from all walks of life, not just the traditional advocates of infrastructure. We listened to each other a lot. We need to listen to a much broader array of people. I think we did that. That needs to continue. That is not a high budget item. That simply means that there is a national focus to this effort.

Obviously the research and development is another key area. It is not so much a matter of creating a lot of new gizmos and gadgets. We have a lot of that basic research in place. We know what works in different settings. It is a questions of finding ways of meshing the current needs with that new technology so that sys-

tems work better. It is the human infrastructure that we need to tend to as much as the physical infrastructure.

Senator MOYNIHAN. Nicely said. Maine is having growth difficulties? I am glad to hear that. That is what you want up in Maine, isn't it?

Mr. Fiers, good morning, sir.

**STATEMENT OF ALAN D. FIERS, VICE PRESIDENT AND DIRECTOR
OF GOVERNMENTAL RELATIONS, W.R. GRACE & CO.**

Mr. FIERS. Thank you. Good morning, Mr. Chairman. This is an interesting transition here. We really didn't coordinate this.

I'm representing W.R. Grace & Co., as you know. I think probably a word of explanation as to why Grace is here is in order. Our Construction Products Division is one of the two leading companies in the world in cement and concrete chemistry.

Senator MOYNIHAN. You've got out of the clipper ship business just in time.

Mr. FIERS. Just in time, that is right.

Senator MOYNIHAN. That was a beautiful and efficient device. You may find that you have to get back into it.

Mr. FIERS. At any rate, the Grace Specialty Chemical Company and its predecessor, Dewey and Almy, have been involved in concrete chemistry for almost fifty years. We maintain a research lab that is one of the largest in the country, if not in the world, in Cambridge, Massachusetts, where we look at applied research in improving durability and strength of concrete structures and so on. My message today to the panel, to summarize, is really quite short.

We believe that there are technologies here and now that are commercially tested and available which, if applied, will extend the life of our infrastructure from the 25 years that we experienced the last time around with the interstate highways, to 50 to perhaps as much as 75 years, if used.

Senator MOYNIHAN. Wow.

Mr. FIERS. Essentially, what we are talking about, and I won't bore you with the technical details—they are in my statement.

Senator MOYNIHAN. We aren't bored by that kind of detail.

Mr. FIERS. We are looking at admixtures which address the issue of corrosion. These are corrosion protectors. There are microsilicas, also known as silica fume, and calcium nitrate admixtures which, when added to the cement, changes the chemistry, making them less pervious to the corrosive elements, particularly the chemical salts, that we find used on the highways today.

Essentially, we believe that if we incorporate these corrosion inhibitors and concrete strengtheners, depending on the environment, we will get anywhere from 20 to 50 years additional service at moderate additional costs to up front construction. This technology is increasingly being used in private sector construction. Some of our States, indeed many of our States, are beginning to look at it in terms of research, and in terms of their planning and testing on some prototypes. Specifications for the use of these types of additives have not been incorporated into public works legislation at this time.

Senator MOYNIHAN. This is what you call life-cycle costing?

Mr. FIERS. That is where I am going, if you will just bear with me for a moment.

We have concluded that rather than mandating technology, Congress should probably specify approaches for design standards. We do that through something called life-cycle costing.

The basic problem we look at here is that there is a proclivity in the public sector to look at getting a low cost up front and to overlook the long-term ramifications of that. We think that through applying life-cycle costing techniques, which is a practice of determining the least cost balance between initial capital costs, maintenance costs, and the useful life of a project, that we can overcome this.

Essentially what you do is to incorporate into your costing such things as repair and maintenance. You look at the life-time of the structure to find what that structure will really cost you in terms of your outlay, maintenance and replacement. Then you compare that with what it will cost you if you were to use the admixtures, at let's say a 15 or 20 percent increased up front outlay, over the life-cycle of the cost.

We think that it makes a lot of sense to apply that sorts of costing criteria to public works. Essentially we think what we will end up doing is building a structure that will last not 25 years but 50 years. It will cost us maybe 15 percent more than the up front outlay, but in the long term save us 80 percent, because it will last 50 years as opposed to 25 years.

Where can you use these sorts of things? We can use them in water supply systems, waste treatments, bridge decks, sea walls, spill ways, penstocks, navigation locks, tunnels, guideways, airways, and those areas that are in harsh environments subject to corrosive elements.

If we were to do this we think there is a good probability, indeed almost a certainty, that we would not be faced with rebuilding our infrastructure 25 years down the road, in 2015. Rather, we could extend it out to 50 years.

Senator MOYNIHAN. It is a fact that we now have a steady stream of money coming into our highway trust fund, which is not used to build anything any longer, but simply to maintain.

Mr. FIERS. That is exactly right. I recall when I was a young student in Ohio when we built the interstate highways. I didn't go back until 1980 and was aghast at what I saw in the corrosion, the rust, and the state of the bridges.

What I am telling the Committee today, is that the technology is available at a moderate cost to prevent that from happening again in 25 years.

Senator MOYNIHAN. You can certainly conceive a structure in the Federal Government that would be an advocate of this sort of procedure that is missing now. You could imagine a Council saying, "Hey, come on. Catch up with these things. We are no longer in the farm to market growth business."

Mr. FIERS. Let me answer the question this way. We think that in order for the public-private cooperation in this endeavor to be successful, the government has to have a structure and a mechanism to set a frame work that pulls technology, that encourages and enhances its development and pushes innovation. If we don't

have that, then fundamentally we are going to be doing a disservice to the taxpayers and the folks whose money we are spending.

Senator MOYNIHAN. Very elegantly put, for a representative of the Grace Company, which more or less came down on abolishing the Federal Government a few years ago.

Mr. FIERS. Just make it a little more stream-lined and effective.

Senator MOYNIHAN. You are not going to go away as we start working on our surface transportation act, which we will be doing shortly.

Mr. FIERS. No, sir. We would hope to work with the Committee at some length in helping to understand these technologies and in developing some of the costing data and such that you would need.

Senator MOYNIHAN. Some of the legislative language?

Mr. FIERS. Even that, yes.

Senator MOYNIHAN. Mr. Bayer, good morning, sir. You are a practitioner of these arcane sciences.

STATEMENT OF DAVID BAYER, CHAIRMAN, NATIONAL INFRASTRUCTURE POLICY COMMITTEE AMERICAN SOCIETY OF CIVIL ENGINEERS

Mr. BAYER. That is true. Good morning, Mr. Chairman. I appreciate the opportunity to be before you today and to discuss this bill. I think it is important that you understand who I am and where I come from.

Senator MOYNIHAN. We know that you come from North Carolina.

Mr. BAYER. I do, yes sir, I do. My name is Dr. David M. Bayer. I am a past member of the Board of Direction of the American Society of Civil Engineers, ASCE, and currently serve as Chairman of their infrastructure policy committee.

ASCE was founded in 1852, and is the oldest national engineering society in the United States. It currently has a membership of over 100,000. Senator Reid mentioned quality of life. I would look at that as one of the Society's real goals, improvement of the quality of life in the world, certainly in the United States.

I am a Professor of Civil Engineering at the University of North Carolina at Charlotte, and past director of their Engineering, Research and Industrial Development Office.

Mr. Chairman, ASCE commends you and this committee for demonstrating outstanding leadership on the infrastructure issue in recent years. ASCE is acutely aware of the crisis and shares your deep concern. It is my personal feeling that while some government agencies may have responsibility for pieces of the infrastructure, it is still very fragmented. The end result still is that the infrastructure is in a crisis. It is not working. Something is not working.

Senator MOYNIHAN. You think that?

Mr. BAYER. Yes, sir, I sure do.

Senator MOYNIHAN. You are speaking to us as Dr. Bayer.

Mr. BAYER. I am really speaking to you as an educator and obviously as a representative of the American Society of Civil Engineers.

The National Council on Public Works Improvement in its two-year, in-depth study that we've referred to several times, *Fragile Foundations*, found that the quality of the infrastructure is an important index in the Nation's economic productivity. As you said, the infrastructure is barely adequate to fulfill the current needs, and is inadequate, insufficient to meet the demands of the future.

The Council in that *Fragile Foundations*, recommended a series of broad range measures to upgrade the Nation's infrastructure. The report was published in February of 1988, yet to date no integrated effort has been undertaken to reverse the decline in the status of America's infrastructure.

ASCE views this bill as a good, albeit modest, first step towards carrying forward that nine-point strategy discussed. ASCE urges the Federal Government, in cooperation with State and local governments, and the private sector to take positive actions to establish public and private partnerships to implement the recommendations of that council.

The powers and duties of the National Infrastructure Council as described in Section 3 of the bill will address one of the key recommendations from *Fragile Foundations*, clarification of the respective roles of Federal, State, and local governments in infrastructure construction and management to focus responsibility and increase accountability.

ASCE endorses in concept the Infrastructure Assistance Program, Technical Assistance Program, and Technology Transfer Assistance Program described in sections 4, 5, and 6, respectively. These programs are aimed at assisting State and Local governments in addressing their infrastructure needs and represent an appropriate role for Federal Government.

ASCE is in strong support of the Research and Development Program in section 7. The National Council on Public Works Improvement called for, "additional support for research and development to accelerate technological innovation." Twenty million dollars to carry out a five-year program to promote the use of innovative technology is a good beginning.

It is important to consider those specific financing measures recommended in *Fragile Foundations* that this bill will not directly address. A National commitment shared by all levels of government and the private sector to increase capital spending by as much as 100 percent above current levels. Accelerated spending of the Federal highway, transit, aviation, and waterways trust funds; removal of unwarranted limits on the ability of State and local governments to help themselves through tax-exempt financing; a rational capital budgeting process at all levels of government.

Clearly those four recommendations involve significant spending and budget items. However, given the magnitude of the problem and cost estimates that are in the range of \$1 trillion, and increasing, the matter of financing has got to be discussed some time. Establishment of the National Infrastructure Council may encourage needed dialogue on the question of infrastructure financing at the highest levels of the Federal Government.

Mr. Chairman, *Fragile Foundations* called for "Additional support for training of public works professionals." It is ASCE's strong belief that the National Infrastructure Council would be an appro-

priate focal point for addressing the apparent engineering and scientific manpower shortage facing the United States. A civil engineering personnel shortage would be a significant obstacle to ambitious plans for infrastructure rebuilding and environmental clean-up efforts in the 1990s and beyond.

In the last six years, the number of undergraduate degrees in civil engineering awarded annually in the United States fell about 3,000, from a high of about 10,500. According to the National Science Foundation, the number of undergraduate science and engineering degrees awarded in 1996, six years from now, will fall short of demand by 45,000. By the year 2010, that is barely 20 years from now, it could be as much as 700,000.

Continuing reliance on foreign educated civil engineers, especially in education, to fill the void in various civil engineering disciplines poses troubling risks for the United States and should not be seen as a cause for complacency.

I sort of added this last section after listening to the first few comments. This is really more my personal feeling. I have talked about this before. I believe that the American public really does not understand the infrastructure problem. They really don't understand it until it directly affects them. They may see a bridge failure and they know how catastrophic that is, but it just sort of goes away. Until it really directly affects the individual, when their water stops running from their spigot in the morning, it is going to be a real problem that you face in getting financing for some of these things. I think we really need to educate the average American as to what the nature of the infrastructure crisis really is.

I appreciate the opportunity to appear before the Committee, and would be glad to address any questions. Thank you.

Senator MOYNIHAN. We know whereof you speak, with regard to that last impromptu section. With things like water supply, the Romans had a better idea. They put their water supply way up in the air where everybody could see it. The Emperor could put his name on it. It worked. It was probably the most magnificent transportation of water.

The first true aqueduct built after 5th century Rome brought water down from the Catskills across the Hudson River to New York City. It was built by a great engineer, Lovejoy. Isn't that part of the professional history? He did it. He did it magnificently, but he did it underground, so no one knows it is there. You can ask anyone in Brooklyn, "How come you can turn a tap on the fifth floor, and water comes out?" They will say, "Because water is there. That is where the water comes from, the tap." No, it doesn't come from the tap. It comes from 200 miles away. He built a great "vee" under the Hudson River. It made its way up. That is how you have New York City, but no one sees it.

Mr. BAYER. That is correct.

Senator MOYNIHAN. Teaching in engineering is increasingly foreign?

Mr. BAYER. Yes. I don't have any statistics to support that, but I have been to enough meetings over many past years that indicate that there is an increase in use of foreign educated individuals, or foreign individuals, sometimes educated here in the United States,

sometimes educated overseas. Nonetheless, foreign nationalities are teaching in our system.

Senator MOYNIHAN. Have lunch at the faculty club at MIT and you will find that out fast enough.

Mr. BAYER. That does not mean to imply their quality is not good.

Senator MOYNIHAN. On the contrary. It does mean, however, it's an exchange with their own that I don't entirely feel happy with. I don't think they do. I don't think you engineers do. Half the graduates of the University of Calcutta will end up in southern California. It is not quite right. You want people to cycle around a lot. It takes an enormous amount of effort to produce a civil engineer. To see them all go is a painful thing.

The one thing this panel makes clear is that Fragile Foundations is not forgotten. I'm going to press this matter. I wonder if you don't share my interest. We look up and we find that we have this enormous miscalculation about the size of the Soviet economy.

There is nothing accusatory about this. We just misread it. Had we known 30 years ago what we know now, we would have behaved very differently, had we known 10 years ago what we know now. One of the difficulties we have had is in responding to Mr. Gorbachev. We have been saying, "Why is he doing these things?" He was doing those things because his country is running out of bread. We were still worrying can we get SDI up before they get SDI up. One of the absolutely central facts seems to be that their distribution system is so desperately bad. It's absent market, also absent roads. More than half, about half of their food production spoils between the time it is harvested and the time it gets to "market."

How we get a response at this point from our government, I don't know. But we are making a case. We have not forgotten it. We will try to move this legislation. The day may come when we have an audience. We have an audience in the Executive Branch, we have no advocates. The point made in 1987, and we said it over and again on the floor, was that the Surface Transportation Act of that year brought the Interstate Highway Program to an end.

We have some snippets here and there. We maintain it, but it is done. What we now do is increasingly sad. To the degree we add to it is only adding lanes and compound problems. So the opportunity to think in some large terms is clearly present.

Whether we will do it or not I don't know. But it won't be for the lack of your trying, and you particularly, Nancy Rutledge. You did everything we could have hoped for. If you can't save America, maybe you will save Woolidge, Maine. Do the good nearest at hand.

I have been handed a paper on behalf of Craig Garimer of the National Infrastructure Conference, who would like to have this in the record. I will do that.

Is there anything further you would like to say, Nancy?

Ms. RUTLEDGE CONNERY. If I may, just very briefly, Mr. Chairman, I am troubled by the fact that we haven't made evidence of progress in the last several years, since Fragile Foundations, and since a great deal of other work in this area. I am beginning to realize that perhaps the reason we haven't found the "holy grail", the way of solving this, or the will to spend the money—I suggest

that we still have the money if we chose to spend it on it; we just put it into other things in the last several years——

Senator MOYNIHAN. We put it into military armament, building to a wartime level of expenditure because we thought the Soviet Union was nine feet tall. We did our calculations wrong.

Ms. RUTLEDGE CONNERY. I think we are beginning to realize, though, that the questions that we were asking originally, "What is the big number? How are we going to find the money?" are simply not the right questions. They don't yield good answers. They don't yield answers that are convincing to the American public to spend more money. I think when we begin to make those critical connections between infrastructure and the things that people value, then we will perhaps see a greater will to spend that money over the Federal level, most particularly at the State and local level, where the services are most clear.

Senator MOYNIHAN. When all looks dark unpromising, consider southern California. That is where all the trouble came from, now suddenly, half a generation later, they are saying, "Hey, maybe we had better do something."

With that I will close this hearing, but continue this subject.

[Whereupon, at 11:22 a.m., the subcommittee was adjourned, to reconvene at the call of the Chair.]

[Statements submitted for the record and the bill, S. 2046 follow:]

STATEMENT OF GALEN RESER

ASSISTANT SECRETARY FOR GOVERNMENTAL AFFAIRS
U.S. DEPARTMENT OF TRANSPORTATION

BEFORE THE SUBCOMMITTEE ON WATER RESOURCES,
TRANSPORTATION AND INFRASTRUCTURE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

CONCERNING NATIONAL INFRASTRUCTURE NEEDS AND
S. 2046 - NATIONAL INFRASTRUCTURE COUNCIL ACT OF 1990

JULY 17, 1990

Good morning, Mr. Chairman and members of the Subcommittee. I am Galen Reser, Assistant Secretary for Governmental Affairs for the Department of Transportation. I appreciate this opportunity to appear before you today and share the views of the Department on legislation pending before your Subcommittee dealing with National Infrastructure.

We heard a message loud and clear last year when we went out to the American people to develop the National Transportation Policy. Over and over again we were told of the importance of our transportation infrastructure. In ten months, we held 117 public events in 43 towns and cities all over the country. We listened to the American people from every sector and from all walks of life.

There's no question that the state of our transportation system is important to our future. The same holds true for America's competitive standing in the global economy.

At the Department of Transportation, we are addressing the question of infrastructure. We are acting on what we heard

throughout the country and from our sister Federal agencies -- both in our National Transportation Policy and through subsequent initiatives to implement that Policy.

Number one, our proposed five-year aviation package addresses the need to expand capacity to match demand and provide for growth. We call for a 78 percent increase in Federal aviation capital programs for the next 5 years compared to the last 5 years. We want to continue modernizing our air traffic control system -- already the best in the world. We want to increase federal aviation user fees to meet spending needs and spend down the balance in the aviation trust fund.

Number two, we are in developing our highway and transit package that we'll send to Congress next year. We will propose programs designed specifically to meet the demands of the 21st century. We're in the process of developing a new National Highway System that might constitute the interstate and interregional network of the future, serving both urban and rural areas.

Number three, we support providing state and local authorities with more flexibility to meet local transportation needs. That's why we're asking Congress to allow local airports to levy passenger facility charges as a way to generate more funds for airport investment.

The recent passage of Proposition 111 in California shows that people are willing to support higher transportation user fees when they know the money will be targeted to identified needs.

Number four, we're encouraging greater private sector participation across the board. This means resisting attempts to overturn deregulation. And it means eliminating barriers to the private building and financing of highways and transit, and possibly expanding the use of toll roads. We're supporting public/private partnerships in development of new technology, such as magnetically levitated trains and intelligent vehicles and highways.

Those are just a few of the ways we are putting our words into action to restore America's transportation infrastructure. Our main challenge is to elevate the importance of infrastructure investment to the level it deserves.

What gains will we see as a result of the initiatives described above? First, they will significantly enhance the nation's long term productivity and global competitiveness by increasing the efficiency of the movement of goods and services. And second, the development of transportation technologies will lead to great improvements in the way we live. Historically, we've seen this time and time again. Just think of how the steamboat, the locomotive, the automobile, and the airplane have changed the way of life in different generations.

Let me address specifically the legislative proposal currently being considered by this Subcommittee, S. 2046, entitled the "National Infrastructure Council Act of 1990." S. 2046 would establish a permanent National Infrastructure Council. The Council would be responsible for developing infrastructure policy and proposing implementing actions, preparing needs assessments

and setting priorities, and establishing guidelines and procedures for Federal assistance programs.

In light of the initiatives already under way , we do not believe that the Infrastructure Council that S. 2046 would establish is necessary. It is not clear what would be gained through such an expenditure of time and money, and many of the proposed actions are duplicative of existing organizations and activities being conducted by the Department and other Federal agencies.

For example, the bill calls for an annual assessment of needs and priorities. The objective is already being met by various DOT reports and studies, such as: the biennial report on the Status of the Nation's Highways and Bridges: Conditions and Performance; the National Airspace System Plan; the State of the Nation's Transit; and the National Plan of Integrated Airport Systems. Many of the needs that were reported remain to be addressed in the coming years. The estimates themselves, however, do not require annual updating. The proposed technical assistance, technical transfer assistance, and research and development programs in the legislation are duplicative of programs carried out by a number of offices in the Department of Transportation. These programs have been tailored to the specific needs of State and local agencies and the transportation problems that they face.

In addition, the bill charges the National Infrastructure Council with developing and coordinating Federal infrastructure policy, evaluating roles for public and private entities in implementing this policy, and proposing actions necessary to carry out this policy. This duplicates responsibilities given to the

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Secretary of Transportation in the transportation area, which are coordinated through existing interdepartmental and other Executive Branch mechanisms. Further, as I noted earlier, we have undertaken activities, as part of the National Transportation Policy, to address transportation needs for infrastructure across the various modes.

Although we do not presume to speak for other Federal agencies, we know that similar activities are being pursued by many departments and agencies throughout the Federal government. Moreover, where there is a legitimate reason for more formal program coordination, much of that communication is already being done. That is not to say that coordination cannot be improved, but we believe that it should be done based on real program considerations and not by overlaying a general requirement with little real program benefit. Therefore, we believe that, on balance, this legislation is not needed.

In closing, I would like to state that although we oppose S. 2046, the Department is fully committed to addressing the needs of the nation's infrastructure and will cooperate fully with this subcommittee toward this goal.

This concludes my prepared statement, I will be pleased to answer your questions at this time.

TESTIMONY OF
J. CLARENCE DAVIES
ASSISTANT ADMINISTRATOR FOR POLICY, PLANNING AND EVALUATION
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION, AND INFRASTRUCTURE
OF THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
WASHINGTON, D.C.

July 17, 1990

Good morning, Mr. Chairman and Members of the Subcommittee. I am Terry Davies, Assistant Administrator for Policy, Planning and Evaluation at the U.S. Environmental Protection Agency in Washington, D.C. Thank you for the opportunity to address issues related to environmental infrastructure needs, and to offer some comments on S. 2046, the "National Infrastructure Council Act of 1990."

In today's complex environmental setting, EPA's regulatory mission is governed by major laws covering air and water pollution; the protection of drinking water; the treatment, storage and disposal of hazardous waste; the use of toxic chemicals and pesticides; and the storage of substances in underground tanks. EPA's regulations touch every sector of American life.

In the early stages of our work, we focused on the major sources of air and water pollution. The most pressing environmental problems seemed obvious, and the perpetrators were easy to identify. Soot and smoke from automobiles and smokestacks were fouling our air, and sewage and wastewaters from municipal and industrial outfalls were contaminating our rivers and streams.

Air and water pollution regulations have done a great deal to abate these more visible forms of pollution. But the job is far from finished. As EPA is continuing to implement traditional environmental programs, it also is confronting new challenges. Environmental hazards from the use of toxic substances and applications of pesticides are now a major concern. The Agency is taking an aggressive look at drinking water standards and is putting in place programs to protect our ground water from pesticides and leaking underground storage tanks. Ozone depletion, acid rain, and potential global climate change represent problems around which there is a fair amount of scientific uncertainty, but for which we cannot wait for total enlightenment before acting.

These new programs present some new challenges. One of these is assuring the compliance of the ever-increasing number of smaller and smaller sources that are covered by the new regulations. Over the past twenty years, the Agency has developed complex permit programs that govern the discharge of contaminants by large facilities. Now, EPA must establish programs that govern the activities of hundreds of thousands of small sources.

The new environmental programs not only bring many new sources into the regulated community, but also bring many new regulations to bear on sources that before were regulated less intensively. Farmers, for example, once were not regulated directly, but were affected by restrictions on which pesticides they could use. Now, farmers not only are encountering more pesticide restrictions, but

also must comply with new regulations covering surface water runoff, the storage and handling of pesticides and other toxic substances, and the disposal of hazardous wastes.

Municipalities provide an even more striking example of the broad scope of the new environmental programs. There are over 35,000 municipal governments in the United States that are covered by EPA's regulations and many more separate government jurisdictions, including water supply districts and school systems. Although local governments provide a broad range of services, the only significant environmental regulations that affected them in 1970 were those pertaining to sewers and wastewater treatment. Now, municipalities find that several of their services are governed by environmental regulations. Two of the most obvious examples are waste disposal and drinking water supply. In both of these areas, programs encompassing several new environmental regulations are bringing about significant changes. Even local school systems, hardly considered polluters in the conventional sense, now find that they must comply with new regulatory programs covering asbestos and radon contamination.

Clearly, in the complexity of environmental decision-making, consideration of all sectors is important. Environmental infrastructure becomes very important, and I believe that we at EPA are aware of this.

We have a number of programs in place and some very important initiatives underway to understand and support the environmental infrastructure. To highlight some:

- o The EPA-State Committee is a standing committee comprised of EPA Headquarters and Regional senior managers and environmental leaders from the States, whose purpose it is to tackle the significant problems facing States as they move to implement federal regulatory mandates and address State-specific, geographic-specific environmental problems.
- o The National Advisory Council for Environmental Technology Transfer was established to advise the Administrator on management approaches among federal, State and local governments, business, and academia. Its subcommittees on education and training, State and local programs, technology innovation and economics, and international cooperation support all elements of environmental decision-making.
- o In terms of study, the Sector Study, an Agency-wide initiative begun in the fall of 1987, provided an analysis of the cumulative costs of environmental controls then under development on the municipal, small business and agricultural sectors of the economy. It increased awareness in the Agency of the potential magnitude of the cumulative impact of individual actions. It has also prompted us to take action to assure that we carefully consider financial impacts as individual rules are developed.
- o We are enhancing the Nation's capacity to address environmental infrastructure problems through EPA-sponsored research in such areas as hazardous waste clean-up, municipal solid waste treatment, sludge management and disposal, improvements in drinking water treatment, and pollution prevention.
- o An initiative currently underway will set up a forum for governmental and private sector financial experts to present advice on financial topics pertinent to environmental concerns before the Administrator.
- o EPA, in cooperation with the States, conducts the "Needs Survey," a detailed biennial estimate of the cost of construction of all needed publicly owned treatment works in all of the States and of the cost of construction of all needed publicly owned treatment works in each of the States to meet the goals of the Clean Water Act.

- o EPA's Office of Research and Development has a new program directed at technology transfer to State and local governments. The program covers traditional pollution control activities, such as drinking water and wastewater treatment facilities, as well as a few specialized topics like medical waste incinerators. Future areas of assistance will be targeted to specific problems including control of lead in drinking water, source reduction and recycling for small municipalities, and other key issues.

EPA is now implementing a unique program of financial assistance for environmental infrastructure projects. The State Revolving Fund program, established in the 1987 amendments to the Clean Water Act, authorizes the Agency to award grants to capitalize State funds, from which the States can award loans and other types of assistance for wastewater treatment needs. These funds have been successfully established in 44 States. Because virtually all of the assistance the funds can award is to be repaid by local recipients, they are defined to be permanent sources of financing for water pollution control needs, not requiring additional federal subsidies.

In short, EPA believes that environmental infrastructure issues are important. We are continuing to take steps to support the environmental infrastructure as the nature and scope of environmental problems changes, and we certainly agree that there needs to be great emphasis on the environmental impacts of decisions regarding the nation's infrastructure in general. However, we have some concerns about S. 2046, the "National Infrastructure Council Act of 1990," which I would like to set forth now.

S. 2046 is based on the premise that the various infrastructure programs listed in section 2(b) of the bill need to be coordinated by virtue of the fact that they are all infrastructure programs. This premise needs to be carefully examined.

Coordination problems are basically systems analysis problems. Programs or activities that are part of a single system should be coordinated with each other. The definition of a system is that it is a group of entities which are more closely related to each other than they are to entities that are not part of the system. This leads to the key question of the dimension or characteristic of the system that defines "relatedness."

If we take these abstractions and apply them to S.2046, it must be granted that all the listed programs are part of an infrastructure system. But each of the programs is part of other, differently defined, systems as well. Highways, airports, and railroads are part of a transportation system. Shoreline erosion and flood protection, as well as most of the other programs, are part of a land use system. Sewage facilities, waste treatment plants, and waste disposal facilities are part of a pollution control or environmental protection system.

It is the view of EPA that it is more important to coordinate programs and activities within the pollution control system as part of that system than as part of some nationwide infrastructure

system. Coordinating them as pollution control programs may conflict with coordinating them as infrastructure programs.

However, one can coordinate on more than one dimension. Thus one must ask in what ways, if any, is it important to coordinate infrastructure programs with each other. I think there are at least three reasons to consider such coordination:

- o First, infrastructure activities have major impacts on local land use. These impacts are coordinated through local and State land use programs and, nationally, through programs administered by the Department of Housing and Urban Development.
- o Second, infrastructure activities can significantly affect local economies, both positively and negatively. My office has examined the costs imposed on local governments by environmental infrastructure requirements. The Sector Study noted earlier was the product of such an examination.
- o Third, infrastructure programs affect the national economy. But there are numerous mechanisms, from the annual budget process to the Federal Reserve Board, for coordinating these impacts.

Given the importance of coordinating infrastructure programs along programmatic lines (e.g., transportation, pollution control) and the existence of numerous existing methods for coordinating the combined impacts of infrastructure activities, we see no need for the coordinating institutions and activities authorized by S. 2046, and, therefore, oppose its enactment.

This concludes my prepared testimony. I would be happy to address any questions.

DEPARTMENT OF THE ARMY
HEADQUARTERS
UNITED STATES ARMY CORPS OF ENGINEERS
COMPLETE STATEMENT OF
MAJOR GENERAL PATRICK J. KELLY
DIRECTOR OF CIVIL WORKS
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES, TRANSPORTATION,
AND INFRASTRUCTURE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE
JULY 17, 1990

Mr. Chairman and Members of the Subcommittee, I am pleased and honored to be here today to represent the Department of the Army before this Subcommittee to discuss the Army's interest, pursuant to its Civil Works mission, in the Nation's infrastructure and specifically its role in assisting states and local interests in solving their infrastructure problems.

I would like to begin by outlining briefly the problems facing our Nation's infrastructure and review our progress to date in addressing these problems.

Throughout our Nation's history, the U. S. Army Corps of Engineers has actively participated in planning, designing, constructing, and operating and maintaining various aspects of this Nation's infrastructure. Through our Civil Works program, the Corps has been engaged primarily in construction of harbors and waterways, flood control projects and large multiple purpose dams. Our military missions have resulted in the construction of large military facilities, air bases and installations including associated infrastructure such as housing, roads, water supply and waste water treatment plants, and solid waste disposal.

Up until recent studies were completed on public works improvement during the decade of the 1980's, this Nation had not focused on the long term operation, maintenance, and rehabilitation costs that our

infrastructure system would place on the shoulders of future generations. These studies focused the Nation's attention on the need for an improved infrastructure management program. As was indicated in Fragile Foundations, the report completed by the National Council on Public Works Improvement, we need to develop solutions today to rebuild our infrastructure with systems which promise reduced financial burdens for tomorrow. The Corps shares this concern not only for the future of the infrastructure for which we have programmatic responsibility, but for the rest of the Nation. Given the size and nature of these problems, there must be a vigorous pursuit of solutions. Not only must we use existing programs effectively, but we must establish new and creative approaches for effective partnerships between Federal, state and local governments and the private sector.

In keeping with this philosophy, The Assistant Secretary of the Army for Civil Works sponsored a forum in May on Capital Hill with government and industry leaders to discuss opportunities for providing environmental infrastructure facilities through public/private partnerships. At this forum, which included Senator Moynihan; EPA Administrator, William Reilly; government leaders from other agencies; and over 40 industry representatives, we presented a new initiative to encourage the private sector, in cooperation with the Federal, state, and local governments, to finance, construct, operate, and maintain facilities for solid waste disposal, wastewater treatment, water supply and energy generation. One of the important features of this initiative is Corps assistance to EPA with that agency's Public/Private Partnership Program. We are excited about this initiative and believe it is an important step toward solving our environmental service facility problems. This demonstrates whatever the future Federal role in infrastructure is to be, the Corps of Engineers will be prepared to support it.

In addition to this effort, I recently established in the Civil Works Directorate a Corps Infrastructure Task Force which has the responsibility to devise a Corps strategy for its contribution to the total national effort to address our many infrastructure needs. The plan involves maintaining and sustaining water resources, water supply, energy, solid waste disposal, hazardous and toxic waste disposal, and other infrastructure modes within Corps mission areas and under existing authorities. Much of this plan calls for building further on Corps partnerships with other agencies of government.

The Corps also has an infrastructure initiative included in the President's FY 1991 Budget under which the Corps will initiate discussions with other Federal agencies having diverse infrastructure missions in an effort to work together in the development of recommendations for a broad Federal strategy for addressing these problems. We recognize that some of the infrastructure problems are being addressed within existing Federal programs and missions. However, our FY 1991 Budget initiative would provide a catalyst for focusing and integrating Federal attention on infrastructure issues. Through a collaborative, interagency, intergovernmental forum, a creative strategy could be designed to use the resources of the government and private sector to solve the many infrastructure problems facing the Nation.

In summary Mr. Chairman, the Corps is prepared to play a constructive role and is already embarking on a program to assist the Nation in addressing its many infrastructure problems regardless of the passage of S. 2046. In this respect, S. 2046 could preempt our activities and those of other Federal agencies already underway. Accordingly, we believe that a permanent council as proposed by S. 2046 is not the best means of developing a National infrastructure program. In our view Federal policy should continue to be developed through expeditious interagency cooperation rather than with a permanent council.

We do look forward to continuing to work with the Congress, Federal agencies, local governments and the private sector to address infrastructure needs and commend you, Mr. Chairman and Members of the Subcommittee, for your leadership and efforts to improve the Nation's infrastructure. We pledge our support and look forward to working with you in developing a National infrastructure program.

Mr. Chairman, that concludes my statement. I would be pleased to address any questions you or other members of the Subcommittee may have.

TESTIMONY TO THE
SUBCOMMITTEE ON WATER RESOURCES,
TRANSPORTATION, AND INFRASTRUCTURE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

on S.2046
NATIONAL INFRASTRUCTURE COUNCIL ACT OF 1990

Nancy Rutledge Connery
Woolwich, Maine

July 17, 1990

Good morning, Mr. Chairman and members of this Subcommittee. My name is Nancy Rutledge Connery. Thank you for the invitation to testify before you again. On the last occasion, about two and one-half years ago, I served as Executive Director of the National Council on Public Works Improvement (the "Council") which published Fragile Foundations, a report to the Congress and the President on the state of America's infrastructure. Since that time I have continued research, writing and lecturing on infrastructure issues in association with the Public Works Program at Cleveland State University, the Taubman Center for State and Local Government at Harvard University and the Department of Civil Engineering at the Massachusetts Institute of Technology. I would like to speak briefly this morning in support of the National Infrastructure Council Act of 1990 and to offer a few friendly amendments.

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Nancy Rutledge Connery
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Let me step back to the Council's work for just a moment. The most quoted feature in Fragile Foundations was our report card on America's public works. The combined grade-point average back in February 1988 barely skimmed the passing mark. Our assessment of individual categories of public works and their impact on America's economic growth and quality of life portrayed a system slowly wearing out from lack of adequate investment and maintenance. America was not "in ruins" as once reported; neither could we expect to live forever on the interest of the last generation's capital without making a deposit of our own.

Two years later, I doubt that anyone in this room could argue persuasively to raise those grades. In fact, several categories such as hazardous wastes and solid waste disposal are widely perceived to have slipped even lower. Yet despite regular "cover story" status in the media, countless forums, newsletters, and scholarly reports, the infrastructure issue is in an odd sort of limbo. There is no clear public consensus on the proper course of action nor compelling mandate to change the status quo. Standard prescriptions for more federal funding, privatization, revolving infrastructure loan banks, or a more flexible tax code have stirred no one's soul. Some states, including California and Ohio, have passed special construction bond issues but such gains are offset by weakening state and local tax revenues that sustain infrastructure elsewhere.

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Nancy Rutledge Connery
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Perhaps such inaction is a reflection of our reputed cultural "now-nowism,"--an inability to look beyond immediate gratification of consumer demands or the quarterly earnings statement. But I believe that our reticence to invest in infrastructure has deeper meaning. Somewhere in the collective American consciousness we know that the answers are not clear because we still haven't figured out the right questions.

This is not to impugn past research; it went as far as it was able. For example, the National Council on Public Works Improvement addressed the condition of the system and its relationship to the economic growth of the nation. Subsequent work by the Congressional Office of Technology Assessment examined public works management, operations, and financing practices. The Chicago Federal Reserve Bank investigated the relationship of infrastructure investment and the nation's productivity. The U.S. Department of Transportation recently analyzed the future of the nation's transportation systems. All of these gave us important information, but I believe that their greatest role has been to offer insight into what we don't know. Therein lies the beginning of wisdom.

Infrastructure performance is as dependent on the attitudes and actions of users and operators as on the physical integrity of individual structures. Spending more money to expand or rebuild

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Nancy Rutledge Connery
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infrastructure does not promise cleaner water, safer bridges or swifter commutes unless we also willing to confront patterns of consumption, land-use and development, and our stewardship of the existing system. If we expand our highway system to relieve suburban traffic congestion without addressing these other factors, we may simply bring about more commercial and residential sprawl which wastes infrastructure assets and endangers water resources. If our environmental policy continues to emphasize sophisticated pollution control regulation without addressing the cumulative financial and operational implications for many smaller cities and towns, we may squander a considerable investment and further impair our ability to tackle pollution problems.

Genuine renewal of our nation's infrastructure first demands a clear image of what we would create with this investment--besides more construction jobs, lanes of highway, rebuilt bridges, or sludge disposal systems. We need to better understand the collective influence of these structures on our sense of place, our connection to the environment and to each other. How do they affect development and demand for services in surrounding areas? What will our cities and towns look like and how will they feel to live in as a result of new investment?

Such questions may seem woolly in the political hard-ball, "30-

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Nancy Rutledge Connery
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second sound-bite" atmosphere of Washington, but I believe that they must be answered before we will find critical mass in a consensus to invest more money in infrastructure.

The National Infrastructure Council Act of 1990 could serve as an effective vehicle for addressing this next generation of critical questions as well as providing a focal point and catalyst for continuing research, information and technical assistance. It need not and should not entail a costly bureaucracy; instead it should represent an independent forum that draws on the resources of all relevant federal agencies to solve cross-cutting problems.

The National Research Council, the principal operating agency of the National Academy of Science and the National Academy of Engineering, is currently undertaking a series of colloquia on infrastructure with support from the National Science Foundation and the Army Corps of Engineers. I am currently a member of the Building Research Board which is a part of NRC and am leading the infrastructure effort. I encourage you to consider the National Research Council as a key element in the design of the National Infrastructure Council.

In terms of representation on the Council, I urge you to include the Secretary of Housing and Urban Development and the Secretary of Agriculture among its members. Both agencies represent policy

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Nancy Rutledge Connery
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areas of considerable direct bearing on infrastructure supply and demand. I also encourage you to include representatives of the National Governors' Association, the National League of Cities, the Conference of Mayors', the National Association of Regional Councils, and the National Association of Counties, and the National Conference of State Legislatures to help provide the direct involvement of the levels of government most directly affected by federal policy decisions. Like politics, all infrastructure is "local."

Thank you again for this opportunity to testify on this important issue.

Statement of Alan D. Fiers
before the
Subcommittee on Water Resources,
Transportation and Infrastructure
Committee on Environment and Public Works
U.S. Senate
July 17, 1990

It is a pleasure to have this opportunity to provide testimony in support of a number of findings and recommendations of the National Council on Public Works Improvement and on the need to institute changes in public policy to effectuate these recommendations.

W. R. Grace & Co.'s interest is two-fold--

First, from a responsible citizen's perspective, we are deeply interested in assuring effective expenditures of public funds for infrastructure, operation and maintenance activities;

Second, from a more parochial basis and reflecting Grace's business interests in construction products, we are concerned that project evaluation processes include life-cycle cost analysis in order to encourage technological innovation.

Grace Specialty Chemical Co. and its predecessor, Dewey and Almy, have been involved in conducting concrete technology/chemistry research for over 55 years. The Grace Construction Products Division owns and operates one of the nation's largest private research laboratories for cement and concrete. The lab,

located in Cambridge, Massachusetts, focuses its applied research on improving durability and strength of concrete and concrete products. This and research conducted by other companies has resulted in broadening the use of concrete in construction applications as well as substantially extending useful life under adverse conditions with significantly reduced maintenance requirements.

Examples include, for instance, the use of microsilica (also known as silica fume) and calcium nitrite admixtures which provide corrosion protection. Microsilica reduces the permeability of the concrete, considerably slowing the ingress of water-borne chlorides. Calcium nitrite corrosion inhibitor promotes the stabilization of the reinforcing steel's natural passivating layer, thereby controlling the corrosion rate. These admixtures may be used individually or in combination for the most severe corrosive environments. Both products have a long history of application and success.

Use of corrosion protection is common practice in many industries. However, it is a fairly new design feature for concrete structures. Incorporation of corrosion protection into initial design offers the promise of an additional 20-50 years of service at moderate additional costs. This technology is increasingly being used in private sector construction. Some states are also beginning to move in this direction, however, at

this time, while extensive research is being conducted by the American Society of Testing Materials (ASTM), American Concrete Institute (ACI), American Association of State Highways and Transportation Officials (AASHTO), and the Federal Highway Administration, specification for use of corrosion inhibiting admixtures has not been provided.

We have concluded that rather than mandating technology, Congress should specify an approach for design standards such as life-cycle costing. Such an approach will continually assure the development and use of new technologies. This will also help overcome political resistance to increased front-end costs.

Life-Cycle Costing:

Life-cycle costing is a practice of determining the least cost balance between initial capital costs and maintenance costs over the useful life of the project. This approach contrasts with that of designing to a fixed term useful life, say 25 years.

Life-cycle costs analysis is especially important for those projects or project components that are subject to adverse environmental conditions or are sufficiently critical that repair or replacement imposes substantial direct and indirect non-project costs to users and society. Examples of such critical projects include:

- Water supply systems (need for continuous service)
- Waste treatment systems (need for continuous service)

- Bridges -- decks, supporting beams and columns, abutments
- Sea walls
- Spillways/stilling structures
- Penstocks
- Navigation locks
- Tunnels
- Guideways and abutment supports -- mass transit
- Piers
- Roadways

Incorporation of a concept such as life-cycle costing into analysis of key public works projects is embodied in several key recommendations of the National Council for Public Works

Improvement:

- * Improving the efficiency and performance of capital investments
- * Establishing a rational capital budgeting process at all levels of government, and
- * Agreeing the level of effort applied to infrastructure research falls short of current and future requirements.

Efficiency & Performance:

The Council Report identifies government regulations as having a "major impact" on design standards for key project groups as highways & bridges, mass transit, and water resources as shown on the following table. This indicates the necessity for a "life-cycle costing methodology" to be identified in regulation for certain types of critical projects. In addition, we believe decision criteria for assessing projects other than those which I have identified should be included to achieve comprehensive coverage.

This will help assure consistent life-cycle cost evaluation of alternative investments. Comparable performance measures and

EXHIBIT IV-8: IMPACT OF CERTAIN REGULATIONS ON PUBLIC WORKS

Category of Public Works Type of Regulation	Airports and Airways	Highways, Streets, Roads & Bridges	Mass Transit	Wastewater Treatment	Water Resources	Water Supply	Hazardous Waste Management	Solid Waste
Economic	0 ^a	0 ^a	- ^b	0	0	†† ^b	0	0
Environmental	†† ^b	-	-	††	†	- ^c	††	††
Public health	0	0	0	- ^c	-	††	- ^c	- ^c
Labor market	†	††	††	††	††	-	0	0
Worker safety	-	-	-	-	-	-	-	-
Design standard	††	††	††	- ^c	†	- ^c	- ^c	- ^c
Handicap	-	-	†	0	-	0	0	0
Procurement	-	†	†	0	-	0	0	0
Project selection criteria	- ^d	0	† ^d	0	† ^d	0	0	0

KEY: †† Major impact † Lesser impact - Minimal impact 0 Not applicable

^aImpacts are due to federal deregulation of carriers.

^bImpacts are due to local regulation establishing monopoly positions for operators.

^cRegulations concerned specifically with water supply are classified as public health regulations; regulations (including design standards) concerned more broadly with the environment are classified as environmental.

^dMay result in positive net benefits.

SOURCE: Apogee Research, Inc., "Government Regulation and the Provision and Cost of Public Works," prepared for the National Council on Public Works Improvement, October 13, 1987, p. 6.

measurements for the durability of structures and equipment will identify trade-offs between: (1) lower initial cost projects having shorter-term durability and higher maintenance/repair and more frequent replacement costs vs. (2) higher initial cost projects having longer-term durability and lower maintenance and repair costs.

Rational Capital Budgeting:

A consistent life-cycle cost analysis approach will improve the capital budgeting process. Necessary project level information required for life-cycle costing will allow project selection on the basis of need and efficiency rather than more subjective factors.

In this regard, life-cycle costing serves as a bridge between "economic efficiency analysis" which many find complex and esoteric and "cost-effectiveness analysis" which can be demonstrably to narrow and one-dimensional. It improves overall understanding of the implications of project expenditures and raises the comfort level of the project manager's decision.

Life-cycle costing also explicitly factors in maintenance and replacement costs and life expectancy into the initial decisions. In this regard it addresses a key concern of the Council -- the invisibility of maintenance costs. It raises the visibility of maintenance expenditures at a critical juncture --

the start of the project -- and therefore will reduce the vulnerability of public works budget for maintenance expenditures.

Accelerating Innovation in Public Works:

Technological innovation is a key factor in improving performance of infrastructure investments. Development and acceptance of new technology requires full identification of life-cycle costs and such analysis is necessarily an integral part of technological development.

Again, a consistent or comparable methodologies for such assessments are required. Presumably, these would be the same methodologies used in project selections.

In closing, whenever there is a public-private partnership, government regulations need to be established to pull technology and encourage its development and acceptance. We believe the private sector will continue to be the best engine for innovation.

However, the framework for evaluation and acceptance of advances in technology needs to be better established in governmental regulations. Such guidelines will likely accelerate innovation.

This time around, we don't want to rebuild our infrastructure again in 25 years, when there is readily available and proven technology that can assure project life for 50 years and longer.



AMERICAN SOCIETY OF
CIVIL ENGINEERS

Washington Office
1015 15th Street, N.W., Suite 600
Washington, D.C. 20005
(202) 789-2200

TESTIMONY OF
DR. DAVID M. BAYER
ON BEHALF OF THE
AMERICAN SOCIETY OF CIVIL ENGINEERS
ON
S. 2046
THE NATIONAL INFRASTRUCTURE COUNCIL ACT OF 1990

BEFORE THE
WATER RESOURCES, TRANSPORTATION, AND INFRASTRUCTURE SUBCOMMITTEE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

JULY 17, 1990



*Civil engineers make the difference
They build the quality of life*

Good morning, Mr. Chairman and members of the committee. I appreciate the opportunity to appear before you today to discuss S. 2046, "The National Infrastructure Council Act of 1990." My name is Dr. David M. Bayer. I am a past member of the Board of Direction of the American Society of Civil Engineers (ASCE) and currently, I serve as Chairman of ASCE's National Infrastructure Policy Committee. I am past Director of the Engineering Research and Industrial Development Office, past Director of Engineering Cooperative Education, and Professor of Civil Engineering at the University of North Carolina at Charlotte.

ASCE was founded in 1852, and is the oldest national engineering society in the United States. Membership, held by more than 100,000 individual professional engineers, is about equally divided among engineers in private practice; engineers working for federal, state or local governments; and those employed in research and academia. The Society's major goals are to develop engineers who will improve technology and apply it to further the objectives of society as a whole, to promote the dedication and technical capability of its members and to advance the profession of civil engineers.

Mr. Chairman, I respectfully request that my written statement and attachments, including a recent publication of the Rebuild America Coalition "America's Infrastructure: Preserving

Our Quality of Life," be inserted into the committee's hearing record.

Mr. Chairman, ASCE commends you and this committee for demonstrating outstanding leadership on the infrastructure issue in recent years. As technical professionals serving on the front lines of America's infrastructure crisis in the areas of transportation, water, and the environment, ASCE shares your deep concern about the deteriorating condition of the nation's essential public works facilities or "America's Lifeline Network." After a decade of reports and growing public awareness about the importance of America's infrastructure, ASCE believes that a consensus is slowly emerging to reverse the era of neglect toward our vital public works facilities.

National Council on Public Works Improvement

The National Council on Public Works Improvement (NCPWI), in its two-year, in-depth analysis and study of the Nation's infrastructure, found that the quality of infrastructure is an important index of a Nation's economic vitality. The quality of America's infrastructure is barely adequate to fulfill current requirements, and insufficient to meet demands of future economic growth and development. The Council, in its report, Fragile Foundations, recommended a series of broad range measures to upgrade this Nation's infrastructure.

The National Council published its final report in February 1988, yet no integrated effort has been undertaken by the public and private sectors to reverse the decline in America's infrastructure. Therefore, ASCE believes the Federal Government together with state and local governments and the private sector must work in concert to address the infrastructure problems facing this Nation. The recommendations of the National Council can serve as an excellent starting point for these public/private partnerships.

ASCE views S. 2046 as a good, albeit modest, first step toward carrying out the nine-point "Strategy for Improving America's Public Works" as recommended by the NCPWI. ASCE urges the Federal Government, in cooperation with state and local governments and the private sector, to take positive actions to establish public and private partnerships to implement the recommendations of the National Council. ASCE is prepared to participate in a partnership to implement the National Council's recommendations, particularly in the areas of management programs, education, and research and technological innovation.

S. 2046 helps to address one of the key recommendations in Fragile Foundations:

- Clarification of the respective roles of the federal, state, and local governments in

infrastructure construction and management to focus responsibility and increase accountability.

As described in Section 3 of the bill, the National Infrastructure Council, which will be composed of the Secretaries of the Army, Interior, Transportation, and Commerce as well as the EPA Administrator, shall:

- (1) develop and coordinate Federal infrastructure policy, evaluate roles for public and private entities in implementing this policy, and propose actions necessary to carry out the policy;
- (2) prepare an assessment of national infrastructure needs and priorities on an annual basis;
- (3) establish guidelines and procedures for the coordination and provision of Federal assistance to states and local governments on all infrastructure matters;
- (4) develop priorities and recommendations for Federal infrastructure investments to be undertaken based upon the needs assessment; and
- (5) transmit its priorities and recommendations to the President and the Congress.

In concept, ASCE endorses the Infrastructure Assistance Program, Technical Assistance Program, and Technology Transfer

Assistance Program described in Sections 4, 5 and 6, respectively. These programs are aimed at assisting state and local governments in addressing their infrastructure needs and represent an appropriate role for Federal Government.

ASCE is in strong support of the Research and Development Program in Section 7. The NCPWI called for, "additional support for research and development to accelerate technological innovation." \$20 million to carry out a five-year program to promote the use of innovative technology in the design, construction, improvement, rehabilitation, use, operation, and management of infrastructure is a good beginning.

Mr. Chairman, S. 2046 will help to build on the excellent recommendations of the NCPWI. Moreover, establishment of the National Infrastructure Council would raise the visibility of the infrastructure issue among top policymakers in the Administration.

Recognizing, of course, that no single bill can address every recommendation in Fragile Foundations, it is, nevertheless, important to consider those specific financing measures recommended by the NCPWI that S. 2046 will not directly address:

- A national commitment, shared by all levels of government and the private sector, to

increase capital spending by as much as 100 percent above current levels;

- Accelerated spending of the federal highway, transit, aviation, and waterways trust funds;
- Removal of unwarranted limits on the ability of state and local governments to help themselves through tax-exempt financing;
- A rational capital budgeting process at all levels of government.

Clearly, these four recommendations involve significant spending and budget issues. However, given the magnitude of the problem and cost estimates running as high as \$1 trillion or more, the matter of financing must be confronted sooner or later. Establishment of the National Infrastructure Council may encourage needed dialogue on the question of infrastructure financing at the highest levels of the Federal Government, as well as on an intergovernmental basis.

Lastly, Mr. Chairman, Fragile Foundations called for "Additional support...for training of public works professionals." It is ASCE's strong belief that the National Infrastructure Council would be an appropriate focal point for addressing the apparent engineering and scientific manpower shortage facing the United States. A civil engineering personnel shortage would be a significant obstacle to ambitious plans for

infrastructure rebuilding and environmental cleanup efforts in the 1990's and beyond.

Between 1983 and 1989, the number of undergraduate degrees in civil engineering awarded annually in the U.S. fell from about 10,500 to 7,688, a 27% decline. According to the National Science Foundation, the number of undergraduate science and engineering degrees awarded in 1996 will fall short of demand by 45,000. By the year 2010, the shortfall may be 700,000.

Current demographic trends could exacerbate the problem. The civil engineering profession will have to attract large numbers of minorities and women, who traditionally, have not been inclined to become engineers.

Continuing reliance on foreign educated civil engineers to fill the void in various civil engineering disciplines poses troubling risks for the United States, and should not be seen as a cause for complacency.

Mr. Chairman, this concludes my testimony. I would be happy to address any questions.

NATIONAL COUNCIL ON PUBLIC WORKS IMPROVEMENT RECOMMENDATIONS

Approved by the National Infrastructure Policy Committee
on January 8, 1990.

Approved by the Committee on Policy Review on March 7, 1990.

Adopted by the Board of Direction on April 22, 1990.

Policy

The American Society of Civil Engineers (ASCE) urges the Federal Government, in cooperation with state and local governments and the private sector, to take positive actions to establish public and private partnerships to implement the recommendations of the National Council on Public Works Improvement. ASCE is prepared to participate in a partnership to implement the National Council's recommendations, particularly in the areas of management programs, education, and research and technological innovation.

Issue

The National Council on Public Works Improvement, in its two-year, in-depth analysis and study of the Nation's infrastructure, found that the quality of infrastructure is an important index of a Nation's economic vitality. The quality of America's infrastructure is barely adequate to fulfill current requirements and insufficient to meet demands of future economic growth and development. The Council, in its report, Fragile Foundations, recommended a series of broad range measures to upgrade this Nation's infrastructure.

Rationale

The National Council published its report in February 1988, yet no integrated effort has been undertaken by the public and private sectors to reverse the decline in America's infrastructure. Therefore, ASCE believes the Federal Government together with state and local governments and the private sector must work in concert to address the infrastructure problems facing this Nation. The recommendations of the National Council can serve as an excellent starting point for these public/private partnerships.

INFRASTRUCTURE RESEARCH AND INNOVATION

Approved by the National Infrastructure Policy Committee
on November 14, 1989.

Approved by the Committee on Policy Review on March 7, 1990.

Adopted by the Board of Direction on April 22, 1990.

Policy

The American Society of Civil Engineers urges government officials and private citizens to encourage education, research and development related to infrastructure facilities in order to increase productivity in design, materials, construction, maintenance and operations while maintaining engineering quality and structural integrity.

ASCE believes that appropriate methods to encourage education, research and development include:

- o Supporting research to accelerate the development of existing technology and develop new technology in the fields of design, materials, construction, maintenance, rehabilitation, and operation of the infrastructure;
- o Focusing national attention on infrastructure needs through cooperative efforts such as the Rebuild America Coalition;
- o Supporting legislation and policies that encourage adoption of new techniques;
- o Supporting establishment of an appropriately funded infrastructure research program at the federal level which would be developed in conjunction with state/local agencies and private enterprise;
- o Encouraging, through appropriate incentives, industrial research leading to the development of new or improved materials, equipment and methods for construction of infrastructure facilities;
- o Supporting establishment of a National Clearinghouse to identify and provide information on Federal, state, and local government and private sector infrastructure research and development activities;
- o Encouraging leadership that supports progressive planning, financing, design, construction, maintenance, rehabilitation, and operation of infrastructure systems;

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- o Providing incentives to consultants and contractors who are willing to develop new approaches;
- o Supporting efforts to limit the added risk and liability that may be associated with innovative infrastructure technology;
- o Recognizing that innovation carries with it the additional responsibility for continuing the new processes until the project is successfully completed.

Issue

In 1988, the National Council on Public Works Improvement estimated that a doubling of the annual expenditure of \$90 billion spent on infrastructure is needed to meet national infrastructure needs. Doubling of funding, even through the use of innovative financing techniques, is unlikely. Thus the primary answer to the funding challenge is to "work smarter" - to increase productivity through the development of innovative design, materials, construction, maintenance, and operation techniques.

Currently, there are a number of obstacles which discourage innovation on a widespread scale. Civil engineers, for example, are under increasing pressure to eschew innovation and to be conservative in their judgment because of lawsuits, rules, regulations, legislation, standards, and a desire for predictability.

The benefits of innovative infrastructure technology cannot be measured immediately, but can be realized from a long-term commitment. Fragmentation within the design and construction industry limits the support of long-term research efforts that could result in technological gains and innovation. Appropriate technical innovation and support groups, such as the Rebuild America Coalition, can contribute to progress, cost-effectiveness and improved productivity and quality throughout the infrastructure industry.

Rationale

Increasing public interest in, and reducing obstacles to, innovation is a formidable task and beyond the capability of practicing engineers acting alone. The American Society of Civil Engineers, as the representative body of the profession responsible for the design and construction of the manmade environment, is concerned with funding levels versus infrastructure needs and considers the use of education, research and development leading to innovation as an important way to help close this gap. ASCE should help bring the need for infrastructure innovation to the attention of the public and its elected representatives and officers.

INFRASTRUCTURE FINANCING

Approved by the National Infrastructure Policy Committee
on June 12, 1989.

Approved by the Committee on Policy Review on August 12, 1989.

Adopted by the Board of Direction on October 7, 1989.

Policy

The American Society of Civil Engineers supports the development of new and innovative methods of financing infrastructure and retention and restoration of methods that have been proven successful in the past. These methods include:

- 1) The establishment of infrastructure financing agencies within the states to provide low interest loans for new construction, rehabilitation or replacement of infrastructure;
- 2) Federal loans to state infrastructure agencies to provide the initial and supplementary capital;
- 3) Private financing and operation of infrastructure components such as water systems, water pollution control plants, rapid transit, toll roads, landfills and similar facilities;
- 4) Restoration of investment tax credits, accelerated depreciation, tax-exempt bonds, and loan guarantees to stimulate infrastructure investment by the private sector;
- 5) Application of equitable user fees to provide funds for proper operation, maintenance and establishment of sinking funds for replacement or rehabilitation;
- 6) Use of a capital development budget at the Federal level to separate the national investment needs from the operating expenses, so as to aid in planning infrastructure development;
- 7) Equitable use of development fees and impact fees to pay for new infrastructure construction;
- 8) Dedicated user taxes and trust funds to finance specific classes of infrastructure such as highways and airport/airway systems, and require investment of trust funds in the facilities for which they are mandated;
- 9) Establishment of special service districts or other taxing authorities that can generate revenues to repay the bonds and operational costs of constructing and operating public works facilities.

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ASCE also supports public awareness programs concerning the growing infrastructure crises and public participation on citizen advisory committees for planning, financing, and operating infrastructure facilities.

Issue

Infrastructure is the underlying constructed framework that allows our Nation to function and expand or improve. It consists of the systems and structures for transportation, water supply, irrigation, drainage, flood control, solid and liquid waste disposal, public buildings, and communications that are the national capital investment, which are vital to the economic well being of the country. Although much of the Nation's infrastructure was built and is maintained at the state and local level, it is in the national interest for the Federal government to play an important role in infrastructure planning and financing. Infrastructure represents a vast investment that is deteriorating faster than it is being replaced. As deterioration of the facilities continues, the cost of restoration and rehabilitation escalates, until replacement eventually becomes necessary at an even higher cost. Thus, there is a need to fund restoration, rehabilitation, expansion or replacement of existing infrastructure just to maintain current levels of service. Mandated regulations and shifts in population and employment require the construction of new infrastructure. Traditional public financing procedures are competing with other important demands of society, such as social and welfare issues. Additional capital is needed to construct new, more easily maintained infrastructure for the economy to grow and maintain a competitive position internationally. Therefore, new and innovative financing methods are needed.

Rationale

Much of the Nation's infrastructure was built in the last half of the nineteenth century or the first half of the twentieth century and it generally was financed by local government and private enterprise. Around the middle of this century, the Federal government invested heavily in infrastructure facilities such as waterways, dams, irrigation systems, highways, airports, water pollution control plants and urban transportation. Much of this investment was turned over to local governments for operation and maintenance. As we approach the end of the twentieth century, the Nation's financial needs have expanded, and the roles and responsibilities of the state and federal government have changed. Concerns of public leaders have changed to include providing more economically maintainable infrastructure as well as planning for life cycle funding to include the cost of maintenance. Hence, new and innovative methods of financing infrastructure needs to be developed, and time-proven methods should be retained to meet these changing demands.

INFRASTRUCTURE IMPROVEMENT POLICY

Approved by the National Infrastructure Policy
Committee on March 10, 1988.

Approved by the Committee on Policy Review on March 13, 1988.
Adopted by the Board of Direction on May 8, 1988.

Policy

The American Society of Civil Engineers supports:

- 1) Infrastructure investment in repair, rehabilitation and new construction based on:
 - a. An inventory identifying the infrastructure components and assessing the condition thereof;
 - b. An infrastructure component of the general plan that determines the needs;
 - c. A project selection process that is based on performance standards, predictions of performance versus maintenance strategies and life cycle cost analyses; and
 - d. Multi-year capital and operating budgets for the proposed projects.
- 2) Government at all levels fostering:
 - a. The expansion of research on new materials, technologies and methods that improve performance, reduce maintenance costs, improve the effectiveness of repairs and maintenance, and increase the longevity of facilities; and
 - b. The innovative use of materials, technologies and methods; and
 - c. The dissemination and transfer of information between all levels of government.
- 3) Flexible financing techniques to handle the different problems and needs of various localities and to accommodate the various types of projects.

- 4) User fees to finance infrastructure investment and maintenance. Such fees may be collected through secondary sources, such as motor fuel taxes or through direct metering of service usage.
- 5) Exploration of other financing mechanisms. For example, state governments should form pools of capital investment funds derived from state-backed bonds for use by localities on capital projects.

Issue

The Nation's public works infrastructure includes highways; streets; public buildings; mass transportation; resource recovery facilities; air transport facilities; water systems; waste disposal or treatment facilities; dams; ports and waterways; and other public facilities. In this era of financial restraint, when infrastructure investment has declined significantly as a percent of Gross National Product (GNP) and visible signs of infrastructure deterioration are everywhere, the leaders of this Nation must explore ways of deriving more quality and value from every infrastructure dollar invested. There is a vital linkage between a sound infrastructure and U.S. economic health and competitiveness.

Rationale

ASCE is concerned with the accelerated deterioration of the infrastructure that has occurred over the last two decades and in the general reduction in investment for the preservation and enhancement of our quality of life. However, implementation of the foregoing strategies will reverse the declining investment in infrastructure and initiate ongoing programs of continued capital maintenance and repair.

INCREASING
INFRASTRUCTURE
INVESTMENT

**AMERICA'S INFRASTRUCTURE:
PRESERVING OUR
QUALITY OF LIFE**



R E B U I L D • A M E R I C A

A • C O A L I T I O N • F O R • Q U A L I T Y • I N F R A S T R U C T U R E • I N V E S T M E N T

AMERICA'S INFRASTRUCTURE: PRESERVING OUR QUALITY OF LIFE

American history has shown that the very essence of the American experience is a striving to make a better life, to build, and to leave behind more than we found when we arrived. In recent years, not only have Americans sought an ever higher standard of living, making their children's lives better than their own, they have also become intensely concerned over the quality of that life.

Economist William Baumol of Princeton University has stated that:

Although the term 'quality of life' eludes precise definition, we normally use it to refer to more than just the state of the natural environment. In addition to the cleanliness of our air and water and the condition of forest and field, the quality of life in our highly urbanized society depends critically on a wide range of amenities. Urban sprawl, decaying neighborhoods, and frustrating congestion become fully as important as the degradation of beautiful canyons or the extinction of animal species.

Our quality of life is ensured not just by what we as individuals do, but also by the concerted actions of our community to create and preserve the qualities we admire in our natural and in our built environment. Mayor Terry Goddard of Phoenix, President of the National League of Cities, has said that "Since most Americans live in cities or towns, our quality of life (or lack thereof) is most impacted by city government. Collectively, cities are the basis of American productivity; if our cities are successful in providing high quality services, this country has a chance to meet the challenge of foreign competition. When cities work, America works."

Only through investing in our nation's infrastructure—the roads, bridges, airports, educational and public buildings, water supply and wastewater treatment facilities, and solid waste disposal facilities that form the backbone of our communities—can we as a nation make sure that the quality of life so valued by this generation will be in place for future generations.

Yet, for the past two decades America has been neglecting these same public works. Capital spending on public works investment dropped from 2.3 percent of the gross national product in 1960 to less than 1.1 percent in 1985. The United States now ranks fifty-fifth in the world in capital investment in infrastructure.

This results in congestion and increasing frustration with the way our communities function. But just as important, the American standard of living is put in jeopardy as well. A Massachusetts Institute of Tech-

nology blue ribbon panel, The Commission on Industrial Productivity, noted in the recent book *Made in America* that "To live well, a nation must produce well. In recent years many observers have charged that American industry is not producing as well as it ought to produce, or as well as it used to produce. If the charges are true and if the trend cannot be reversed, then sooner or later the American standard of living must pay the penalty."

To provide for a higher level of productive economic performance in the future, the MIT Commission recommends that the nation focus on four major kinds of investment—basic education and literacy, long-term business strategies, policies that stimulate productive private investment, and investment in infrastructure for productive performance.

It is now widely recognized that the condition of America's infrastructure is at a crisis stage, endangering the public safety, lowering U.S. economic competitiveness, and diminishing the overall quality of life. But the current situation won't even approach the critical nature of the future crisis if remedial actions are not taken now. America's population is expected to increase by forty-four million people over the next thirty years, adding even more pressure to already overburdened public works facilities.

What has caused this decline in infrastructure investment, and consequently, in our quality of life? Since 1970, the American economy has created jobs at a rate twice that of population growth. Metropolitan areas now account for three-quarters of the total U.S. population, with more than forty percent of America living in the suburbs. Nearly ninety percent of the growth during the eighties has been in metropolitan areas.

At the same time, the relationships between federal, state and local governments have been undergoing some major changes during the 1980s. The federal budget deficit, as well as a philosophical view during the Reagan Presidency that more responsibility should shift to the state and local level, has resulted in the termination or reduced funding of many programs that had financed infrastructure projects. The federal share of infrastructure spending for fixed capital formation declined from 41 percent in 1981 to 34.5 percent in 1986. From 1980 through 1987, federal aid to states and cities declined 37 percent in real terms (adjusted for inflation).

The federal government has also enacted mandates and regulatory programs for states and localities to enforce while restricting the resources available to fund these programs. This situation has led Governor Blanchard of Michigan to state that "Washington has gone from revenue sharing to revenue bleeding." The federal



government, confronting budget deficits of its own, also terminated its revenue sharing program with the states but continues to order up programs for the states to implement.

In America, 83,216 state, county and municipal governments, as well as special districts and school districts, share responsibility with the federal government for providing the public works that form the nation's infrastructure. Where one federal program, revenue sharing, satisfied many needs, now thousands of governments at all levels must take action to fill the gaps created. "Obviously, . . ." Mayor George Latimer of St. Paul has written, "we need to approach our problems differently. We need to approach them in a way that is new, up-to-date and realistic, but one which is rooted in traditional American values and acknowledges the limited level of resources available."

The general revenue sharing program, which returned \$4 billion to local governments, was abolished in 1986. Programs providing funding for rural America have been cut by over 67 percent since 1980. Secondary highway systems lost over 60 percent of funding, the Farmers Home Administration water and wastewater disposal grants lost 75 percent, the Environmental Protection Agency's construction grants program was cut by three-quarters, and Community Development Block Grants lost one-third of funding.

Even some of our most vital infrastructure programs are being held hostage to the federal budget deficit. Users of the nation's transportation systems contribute user fees in the form of gasoline taxes and the ticket tax on air travel to be maintained by the federal government in dedicated trust funds. The proceeds of these transportation trust funds can only be spent for these surface and aviation transportation programs. When the federal government does not invest all the money that is collected for pressing highway and airport needs, a balance mounts in the federal Treasury which is used to reduce borrowing needs to finance other federal programs. Currently, about \$28.8 billion remains unspent in these two funds while Americans cool their collective heels on airport runways and in traffic jams.

The funding crisis in the capital programs of state and local governments is easily seen when specific cities are examined. For example, New Orleans received \$89 million in 1984 in federal and state aid. In 1988, the city only received \$22 million. In fact, eight percent of general purpose local governments in the U.S. now receive no federal funding at all. A survey of City Fiscal Conditions in 1989 by the National League of Cities found that in response to budgetary pressures, 36 percent of municipalities reduced capital spending this year. A majority of the cities cited loss of federal funding, particularly revenue sharing, as the major reason causing them to cut infrastructure spending.

What remains as the most stable method of raising money for public investment is state and local government borrowing. The primary vehicle for such borrow-

ing is the tax-exempt municipal bond. Municipal bonds have traditionally been a staple of state and local project finance. The exemption from federal taxes on municipal bonds allows state and local governments to finance their public projects at much lower interest rates than those available to private corporations.

In addition, borrowing allows state and local governments to spread the costs of their investments over time, as benefits from the investments accrue. In 1986 borrowing accounted for 50 percent of all state and local capital investment. Moreover, public approval for this kind of borrowing is high. In the 1980s over 74 percent of the bonding authority requested by state and local government through bond referendums has been approved by voters. Clearly, voters understand the importance of public investment to address infrastructure needs, and the need for states and localities to borrow to finance this investment.

AMERICAN PUBLIC SAYS "YES" ON BOND ISSUES

Year	Percent Volume Approved	Total Volume Approved*	Total Volume Voted On
1989 **	70.1%	\$ 4,510.0	\$ 6,433.7
1988	80.7%	\$ 21,130.0	\$ 26,183.4
1987	73.3%	\$ 8,480.0	\$ 11,568.9
1986	82.7%	\$ 13,370.0	\$ 16,166.9
1985	83.2%	\$ 9,160.0	\$ 11,009.6
1984	81.0%	\$ 10,630.0	\$ 13,123.5
1983	61.1%	\$ 7,160.0	\$ 1,171.5
1982	83.2%	\$ 8,890.0	\$ 10,685.1
1981	57.2%	\$ 5,030.0	\$ 8,793.7
1980	71.0%	\$ 6,280.0	\$ 8,971.4

Note: Voter turnout is lighter in non-election years, making bond issues more difficult to pass.

* All dollar amounts are given in millions.

** Does not reflect November, 1989 elections.

Source: The Bond Buyer

Unfortunately, federal policy-makers in the mid-1980's seemed less favorably inclined to state and local borrowing. Over the last decade the federal government has taken steps to limit the scope of tax-exempt borrowing through a variety of means. On the supply side, private participation in projects financed by tax-exempt bonds has been limited, reducing the scope of public-private partnerships. The volume of tax-exempt bonds issued for certain purposes has also been restricted. Moreover, the federal government has limited the ability of state and local governments to earn money on borrowed funds while these funds are idle, pending expenditures on public projects. Prior to the imposition of these limits, state and local governments used investment earnings to reduce the cost of their projects. All of these measures have limited the ability

of states and localities to finance important public projects with tax-exempt bonds.

Equally important is that steps have been taken to limit the attractiveness of municipal bonds to investors. Subjecting certain types of otherwise tax-exempt municipal bonds to the alternative minimum tax weakens the demand for these bonds by property and casualty insurance companies, the major corporate investor in bonds. Furthermore, banks have essentially been eliminated as investors in most kinds of long-term municipal bonds through the elimination of their ability to deduct the cost of carrying these bonds. These restrictions on demand mean that state and local governments must pay higher interest rates to attract investors for their bonds. Higher interest rates, of course, increase the costs associated with financing public projects.

Postponing action on infrastructure investment also leads to increasing costs. Not only do facilities continue to deteriorate, but a four percent rate of inflation would mean that a 60 percent increase in funds would be needed by the year 2000 just to have the same buying power.

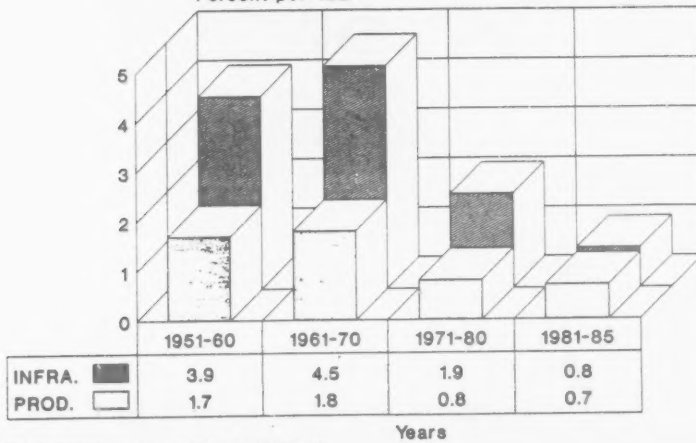
If the costs of delay are prohibitive, the benefits of taking action now are enormous. David Aschauer, a senior economist at the Federal Reserve Bank of Chicago, says that "Raising the level of public investment spending from its current abysmal level of less than one-half of one percent of GNP to a modest 2 percent—some \$80–90 billion dollars per year—would work wonders." Dr. Aschauer bases his conclusions on research demonstrating a relationship between public investment and productivity in the major industrialized countries.

In a recent article, Dr. Aschauer concludes that "an increase in the level of public investment by one percent of gross output yields a gain in productive growth of about 0.4 percent per year." In earlier articles, Aschauer points to differing rates of productivity growth in the major industrialized countries. The clear implication of Aschauer's work is that the United States can take positive action to improve its economic fortunes through a policy of increased public investment.

A closer look at each area of our nation's infrastructure reveals the threat to our quality of life and our standard of living on each front. The costs of repair

INFRASTRUCTURE AND PRODUCTIVITY

Percent per Year

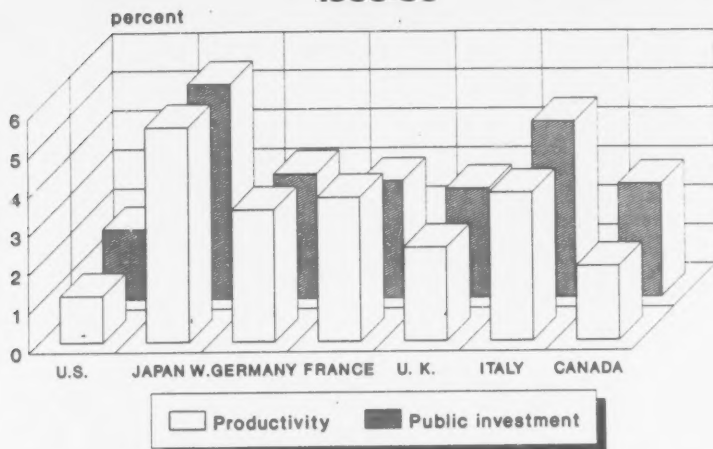


SOURCE: BUREAU OF LABOR STATISTICS

The growth rate each year in public capital stock measure infrastructure investment; the growth rate of productivity in the economy is measured by the annual growth rate of total factor productivity.



"GROUP OF SEVEN" COUNTRIES 1960-86



SOURCE: OECD

Productivity is the average annual growth rate in total factor productivity from 1960-1986; public investment is the average annual increase over the last 25 years in public facilities.

and meeting the needs of growth are high, but are clearly justified in every area. The infrastructure needs described fall into two interrelated major concerns—

ensuring a clean, safe environment and providing an efficient transportation network.

QUALITY OF LIFE: A CLEAN, SAFE ENVIRONMENT

A clean, safe environment is central to the concept of 'quality of life.' The evidence shows incontrovertibly that the real cost of pollution is high. At the least, water pollution damages aquatic life and interferes with commercial fishing. The availability of a ready supply of clean drinking water is basic to society as we know it. Protection from the harmful impact hazardous waste can have on our communities is also expected from our government.

Business Week (August 21, 1989) examined new methodologies being developed by economists to assess the importance of the environment, concluding that "Economists are coming up with numbers that show that people put an extraordinarily high value on preserving an unspoiled environment. And even if the methods aren't perfect, being able to place a value on the wonders of nature will make paying for a clean environment less onerous."

Public buildings also play a central role in ensuring a safe and healthy community. As important as the natural environment is, communities rely on their schools, their courts, their fire stations, their hospitals, and their prisons to provide the backbone of civilized society. Much higher levels of investment are required to rebuild the vertical infrastructure, such as asbestos removal in many of the nation's older school buildings, and provide additional capacity, as in the need to build many additional prisons to meet court orders.

CLEAN WATER

Cleaning up the nation's polluted rivers, bays and streams to preserve the environment for fishing and recreational uses continues to be a priority demanded by the nation's citizens. Since signing of the Water Quality Act of 1965, over \$60 billion of federal funds

have been spent cleaning up the nation's waterways. The quality of some 47,000 miles of monitored streams has markedly improved as a result. In Lake Erie—pronounced biologically dead 15 years ago—perch, walleye, and even largemouth bass and coho salmon are thriving. Trout have returned to the Hudson River near New York City.

According to the Environmental Protection Agency's National Water Quality Inventory Report, substantial reductions have occurred in pollutants. Sewage treatment plants are removing about 13,600 tons per day of the two principal conventional pollutants—suspended solids and Biological Oxygen Demand—an increase of 65 percent over 1973 levels.

But elsewhere, 311,000 miles of water have worsened or remain unchanged. The Environmental Protection Agency compiles a biannual survey of the cost of constructing publicly-owned wastewater treatment works necessary to meet the goals of the Clean Water Act. Included in the survey are estimates for all types of required changes to wastewater facilities, such as the construction of entirely new facilities, and enlarging, upgrading, abandoning and replacing existing facilities.

EPA estimates that 10,835 facilities (of a total 15,591) have documented water-quality or public-health problems. Existing facilities are considered for replacement when they have reached the end of their design life and are no longer able to operate satisfactorily.

The 1988 Needs Survey identifies "current needs" for facilities to meet wastewater treatment needs of the U.S. population on January 1, 1988. The survey also provides a projection of "design year needs"—the facilities that will be required to adequately protect the environment by providing the wastewater treatment required for a projected population in the year 2006.

Wastewater treatment plant construction to meet the needs of the population in 2006 will require an additional investment of \$83.5 billion. These needs fall into seven categories:

- Secondary Treatment—\$26.8 billion
- Advanced Treatment—\$5.0 billion
- Infiltration/Inflow Correction—\$2.9 billion
- Replacement/Rehabilitation—\$3.7 billion
- New Collector Sewers—\$13.8 billion
- New Interceptor Sewers—\$14.9 billion
- Combined Sewer Overflows—\$16.4 billion

However, the EPA has estimated that 400 cities and towns will be unable to meet the deadlines set by the Clean Water Act for their secondary treatment facilities. Of the rivers and streams in the United States that do not meet their state water quality standards, 17 percent are failing because of pollution from inadequate wastewater treatment. Of U.S. estuaries, 22 percent are not meeting their standards because of needed wastewater plant construction.

Eighty-seven percent of all publicly-owned sewage treatment plants in the country provide secondary or better treatment for 95 percent of the nation's sewage.

Secondary treatment protects communities from the disease potential of untreated human waste and removes materials that can rob waters of oxygen necessary for aquatic life.

When the Clean Water Act was reauthorized, only a \$2.4 billion annual funding level was provided toward meeting these \$83.5 billion future needs. Additional funds are being raised at the state and local level, although constrained by changes in the laws governing tax-exempt bonds. New York, California, Florida, Massachusetts, and Texas show the largest construction needs to meet clean water targets.

A separate survey conducted by the Association of State and Interstate Water Pollution Control Administrators summarizes the 7,590 identified municipal wastewater treatment projects that will be necessary to first bring communities into compliance with the Clean Water Act, and then keep them in compliance over the next five years as population increases.

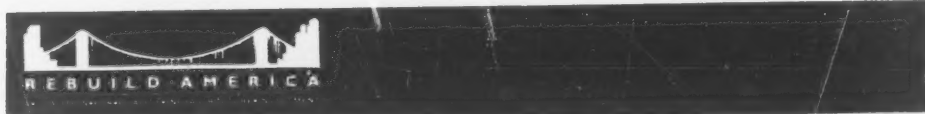
SAFE DRINKING WATER

Rising environmental and public health concerns led to new federal requirements for filtration, disinfection, and lead removal from drinking water mandated by the five-year reauthorization of the Safe Drinking Water Act Amendments (SDA) of 1986. This law applies to all 210,000 public water systems in the nation, including any system that serves 25 or more people or has 15 or more service connections. Almost 40,000 U.S. water systems were out of compliance with the more lenient, pre-1986 requirements.

EPA's ground water supply survey in 1983 found that about 28 percent of randomly selected large municipal water systems (serving more than 10,000 people) had detectable levels of one or more volatile organic chemicals in their ground-water supplies. The agency found that water from 45 percent of large public water systems relying on groundwater had detectable levels of volatile organic chemicals. Forty-two million Americans are exposed to potentially harmful levels of lead in their drinking water.

The Environmental Protection Agency estimates that the cost to localities of meeting these new drinking water mandates is up to \$3 billion annually. The Safe Drinking Water Act Amendments provide some \$55 million over four years for matching grants to states to establish wellhead protection programs. Otherwise, there has been no federal program to provide funding for drinking water systems, and existing financing mechanisms have not been able to meet growing needs.

Perhaps more importantly, many construction needs stem from the need to repair and replace deteriorating systems. A 1986 study by the Congressional Budget Office estimated that water supply needs over the next twenty years will range between \$3.6 billion and \$5.4



WASTEWATER TREATMENT PROJECT NEEDS

State	ASIWPCA Municipal Needs Survey (\$ in millions)				EPA Needs Survey (\$ in millions)	
	Clean Water Act Compliance		Compliance in Five Years		Current Needs	Population Growth Needs
	Projects	Costs	Projects	Costs	Cost	Cost
Alabama	28	\$23.5	69	\$130.0	\$547	\$781
Alaska	0	0.0	39	83.6	107	221
Arizona	1	1.0	104	225.0	542	979
Arkansas	0	0.0	170	35.0	257	370
California	8	718.0	24	658.4	5,257	6,539
Colorado	1	0.3	61	100.4	183	198
Connecticut	5	120.0	55	720.0	1,287	1,392
Delaware	n/a	n/a	n/a	n/a	82	127
Florida	0	0.0	115	781.0	3,964	6,186
Georgia	0	0.0	151	781.0	615	1,007
Hawaii	2	134.4	212	1,091.6	236	413
Idaho	4	1.7	21	61.2	65	124
Illinois	0	0.0	780	1,700.0	2,784	2,958
Indiana	0	0.0	84	284.5	1,582	1,721
Iowa	20	20.0	50	50.0	511	646
Kansas	0	0.0	17	250.0	485	720
Kentucky	34	61.0	97	287.3	1,108	1,457
Louisiana	2	9.0	70	589.0	854	1,189
Maine	22	100.0	61	900.0	288	341
Maryland	0	0.0	79	806.4	866	919
Massachusetts	4	500.0	116	6,400.0	5,445	5,836
Michigan	1	9.0	81	1,200.0	3,125	3,321
Minnesota	24	105.0	60	135.0	902	1,106
Mississippi	20	15.4	25	43.5	410	—
Missouri	2	300.0	19	105.0	955	1,222
Montana	n/a	n/a	n/a	n/a	57	69
Nebraska	0	0.0	350	1,000.0	99	114
Nevada	0	0.0	31	150.0	101	165
New Hampshire	0	0.0	40	175.0	709	864
New Jersey	0	0.0	310	2,900.0	—	3,754
New Mexico	0	0.0	31	65.0	92	130
New York	78	1,754.0	547	5,582.0	11,683	12,721
North Carolina	0	0.0	235	377.0	1,212	1,799
North Dakota	0	0.0	12	45.0	31	34
Ohio	80	71.0	185	440.0	3,141	3,579
Oklahoma	0	0.0	7	28.1	285	478
Oregon	0	0.0	115	1,000.0	982	1,273
Pennsylvania	45	144.2	850	3,004.0	1,439	1,644
Rhode Island	0	0.0	25	63.4	364	408
South Carolina	1	1.0	114	290.4	441	684
South Dakota	0	0.0	35	63.4	81	87
Tennessee	11	9.1	79	148.7	898	1,467
Texas	0	0.0	1,289	3,307.0	3,306	4,975
Utah	0	0.0	39	77.9	292	583
Vermont	5	10.0	20	48.1	202	209
Virginia	0	0.0	173	1,040.0	755	957
Washington	11	886.0	3	2,990.0	2,143	2,685
West Virginia	28	75.0	48	123.9	852	976
Wisconsin	0	0.0	152	625.0	1,204	1,399
Wyoming	0	0.0	0	0.0	17	18
U.S. Total	397	5,086.6	7,230	40,483.8	56,063	80,831

Sources: Association of State and Interstate Water Pollution Control Administrators; U.S. Environmental Protection Agency

billion per year. These needs include the replacement and expansion of distribution systems, and the replacement and expansion of treatment facilities, primarily needed in small systems. These figures are almost evenly divided between deferred maintenance and replacement needs, and new growth needs.

While aged pipes are not inherently a problem, many need in-place cleaning and lining. Old pipes frequently leak, not only losing fresh water but creating water pressure problems. In 1977, the City of Boston could only account for 50 percent of its water after distribution. The city adapted a metering program, and is now spending \$64 million to replace or line all mains more than 100 years of age, or approximately 15 percent of its 1000 mile system.

New York City alone is looking at a \$7.5 billion upgrade to its water supply system. In suburban Los Angeles, the Metropolitan Water District, which supervises 27 different Southern California Water Agencies, plans to spend \$3 billion for new water facilities over the next 20 years.

A survey conducted by the American Water Works Association projects that currently the industry is spending \$4 billion annually, broken down as follows:

- 19% for preventing water source degradation
- 6 % for pumping facilities
- 20 % for treatment facilities
- 43 % for distribution systems (restoration)
- 6 % for storage restoration
- 6 % for general property

The average annual requirement for capital spending has been estimated by the American Water Works Association to be somewhere between \$5 and \$10 billion. EPA has placed national costs at roughly \$56 billion for capital construction over 10 years.

Much of this estimated annual requirement will fall on the thousands of small utilities which need new treatment facilities to ensure that their consumers obtain the same quality drinking water as the rest of the nation. Obtaining capital investment funds is difficult for many of these small systems; many small utilities will need special assistance to achieve safe drinking water standards. At the state level, the Commonwealth of Pennsylvania's Water Facilities Restoration Act is one independent water loan program that addresses this problem.

The provision of adequate water supply is vital not only to individuals, but to industry as well. According to Census data, total estimated water use for manufacturing totalled 10.42 trillion gallons in 1983. More than 80 percent of usage was accounted for by four major industries: chemical and allied products, primary metals, paper and allied products, and petroleum and coal products.

SOLID WASTE DISPOSAL

The nightly news told the story—a barge filled to overflowing with 90 tons of garbage from the north-

eastern U.S. travelled for several months in the Caribbean and Gulf of Mexico as its operators searched for a place to dispose of the cargo. Suddenly a less obvious aspect of the nation's infrastructure crisis moved toward center stage.

Estimates are that 450,000 tons of waste are being generated every day, 95 percent of which are being disposed of in landfills that are rapidly reaching the end of their disposal capacity. The annual U.S. generation of 158 million tons of municipal solid waste would fill a convoy of 10-ton garbage trucks, 145,000 miles long, over half way from here to the moon. The problem is still growing—EPA estimates that with our current garbage practices, the annual solid waste total could reach 193 million tons by the year 2000.

Each man, woman, and child contributes an average of 1,300 pounds a year to the growing mountain of garbage. In 1960, Americans generated waste at a rate of 2.65 pounds per person per day; by 1986, that figure had jumped to 3.58 pounds. More than 40 percent of this solid waste stream consists of the paper and paper products discarded in homes, offices and factories.

A recent EPA study reveals that roughly eighty percent of the municipal solid waste discarded each year in the U.S. is disposed of in the approximately 6,000 solid waste landfills currently in operation in this country. One-third to one-half of these facilities are expected to exhaust their disposal capacity and close by the year 1993.

Many existing facilities are closing as well because their design and operation do not meet Federal or State standards for the protection of human health and the environment. New facilities must be built to replace this diminishing capacity, but they must be environmentally sound, preserve valuable resources, and not present undue risk to human health.

HAZARDOUS WASTE

Another component of the solid waste problem became a focus of attention in the early 1970s—the potentially hazardous wastes generated by industrial production. Every year about 3,000 facilities manage 275 million metric tons of hazardous waste as defined by the Resource Conservation and Recovery Act of 1976 (RCRA). Under this definition, wastes are hazardous if they pose a fire hazard, dissolve materials or are acidic, explosive, or otherwise pose danger to human health or the environment. Most of this hazardous waste results from production of widely used goods such as polyester and other synthetic fabrics, kitchen appliances and plastic containers.

Wastes that are not given proper disposal can pose dangers to human health ranging from headaches to cancer. Hazardous wastes also can seriously damage the environment, for example, by seeping into surface waters and killing fish and other aquatic life. The vast majority of hazardous waste managed annually is



treated in man-made surface ponds and wastewater treatment plants. A relatively small amount—about 2 million metric tons annually—is incinerated. A number of different treatment technologies are used on hazardous wastes to render them less toxic before final disposal.

A more serious problem is the cleanup of uncontrolled disposal sites containing hazardous wastes and other contaminants. These sites can contaminate groundwater, cause explosions, and present other dangers to people and the nearby environment. Most of these abandoned or inactive waste sites, where hazardous materials have escaped, are linked to the chemical and petroleum industries. Many are municipal landfills that have become hazardous as a result of accumulated pesticides, cleaning solvents and other chemical products discarded in household trash. A few are the result of transportation spills or other accidents. Radioactive materials are hazards at about twenty sites.

Approximately 30,000 potentially contaminated sites may pose a threat to human health or the environment. The Superfund process begins with site discovery; the sites currently identified range from a closed-down hazardous waste incinerator in Maine to a leaking underground pipe in Florida. After site discovery, the EPA conducts a preliminary assessment to determine whether further investigation is necessary. If so, a Site Inspection is conducted to assess the potential danger and the site is evaluated using a Hazard Ranking System. Sites with scores of 28.5 or higher are placed on the National Priorities List for attention under Superfund.

Since the Superfund program was established in 1980, almost 9,000 sites have been determined to require no further action, and over 8,000 site inspections have been conducted. The number of Superfund

sites on the National Priorities List now totals 1,224. On these sites, further studies are conducted to determine the nature and extent of the contamination. Cleanup remedies include incinerating contaminated soils to permanently destroy contaminants, depositing contaminated materials in a landfill that is designed to prevent any movement of the contaminants from the fill, and pumping and treating contaminated ground water to clean up an aquifer. To date, over 140 long-term cleanups have been initiated at Superfund sites across the nation.

PUBLIC BUILDINGS

Many of the buildings that make up the vertical infrastructure of our communities are inadequate, either due to their deteriorated condition or because the community's needs have outgrown their capacity. America's schools are just one of the sad examples of the neglect of our built environment.

The National Governors' Association's recently issued 1991 Report on Education cites the fact that the nation's educational infrastructure is old, with many run-down, dilapidated school buildings. A 1988 report by the Education Writers Association found that approximately 25 percent of the nation's school buildings are inadequate, with another 33 percent of the school buildings only adequate. Included in the 25 percent are buildings that have severe environmental problems, primarily asbestos and lead pipes.

The Education Writers Association survey found that facility construction, renovation, and maintenance are not keeping pace with needs, and a backlog of demand is reaching overwhelming proportions. The cost of these needs is estimated to be \$84 billion for new and retrofitted construction and \$41 billion for school maintenance and repairs.

QUALITY OF LIFE: AN EFFICIENT TRANSPORTATION NETWORK

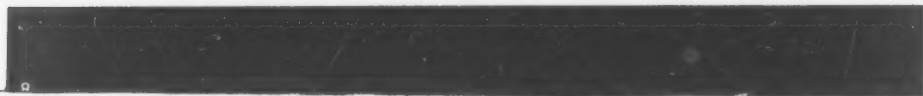
The U.S. transportation network is the largest, most complex in the world. A smoothly functioning, efficient transportation system is a prerequisite for economic growth and is certainly crucial to our everyday lives. Although far too often taken for granted, just one snowstorm, one bridge collapse, one transit strike, or one airport closing is all it takes to illustrate just how dependent we are on the precision performance of every link in our transportation network.

Almost one of every five dollars spent on goods and services in the U.S. economy is spent on transportation products and services. The U.S. transportation system handles 3.5 trillion passenger-miles (one passenger traveling one mile) and 3.4 trillion ton-miles of freight each year.

Transportation is a key factor in the competitiveness of U.S. industries relative to foreign manufacturers. For

every dollar of export goods, about 25 cents is spent on the transportation of raw materials and intermediate goods in the process of being assembled into final products. With the rise in importance of the "just-in-time" method of inventory control, where costs are kept down by having intermediate goods and raw materials arrive at a manufacturer just as they are needed, the smooth functioning of the transportation network is crucial to the cost competitiveness of manufacturing industries.

America's transportation infrastructure is not only deteriorating from aging facilities, but underinvestment in new facilities is overburdening current transportation networks. A look at each of the major components of our transportation system reveals the unraveling fabric of these vital infrastructure systems.



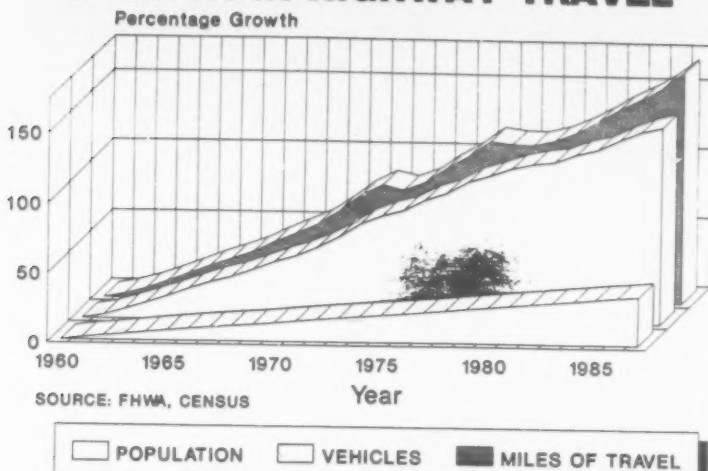
HAZARDOUS WASTE

State	HAZARDOUS WASTE GENERATED IN 1988 (Billions of Metric Tons)		SUPERFUND SITES		
		Rank	Final	Proposed	Rank
Alaska	45.9	50	1	4	44
Alabama	8,515.0	12	10	2	30
Arizona	3,810.3	20	5	6	31
Arkansas	1,013.3	35	10	0	35
California	16,151.8	4	52	46	2
Colorado	1,486.0	33	13	4	22
Connecticut	4,043.2	19	8	6	25
Delaware	883.8	38	12	8	20
Florida	2,839.0	26	32	19	6
Georgia	3,243.6	23	7	7	24
Hawaii	173.6	48	0	7	41
Idaho	1,292.4	34	4	9	27
Illinois	15,342.7	5	23	16	9
Indiana	9,609.0	10	30	7	11
Iowa	1,849.9	31	9	16	14
Kansas	2,470.3	28	9	3	29
Kentucky	4,592.7	16	12	5	21
Louisiana	13,747.5	6	9	2	32
Maine	310.9	45	6	3	39
Maryland	2,981.0	25	7	3	36
Massachusetts	4,267.2	18	21	4	15
Michigan	11,608.4	9	65	16	4
Minnesota	1,933.4	30	40	1	8
Mississippi	2,778.7	27	2	1	47
Missouri	5,703.3	14	14	9	16
Montana	634.8	39	6	2	38
Nebraska	427.8	42	3	2	45
Nevada	381.0	44	0	0	50
New Hampshire	417.9	43	15	1	23
New Jersey	13,289.6	7	100	9	1
New Mexico	555.5	40	6	4	37
New York	9,183.5	11	73	7	5
North Carolina	3,370.7	22	15	7	17
North Dakota	238.2	46	2	0	46
Ohio	18,715.2	2	29	5	12
Oklahoma	2,367.6	29	8	3	33
Oregon	892.7	37	6	1	42
Pennsylvania	17,437.7	3	71	26	3
Rhode Island	1,522.8	32	8	3	34
South Carolina	3,643.8	21	14	8	18
South Dakota	152.0	49	1	0	49
Tennessee	12,982.2	8	10	4	26
Texas	33,792.6	1	24	5	13
Utah	965.4	36	5	7	28
Vermont	217.0	47	4	4	40
Virginia	4,340.8	17	12	9	19
Washington	6,006.6	13	25	20	7
West Virginia	5,655.3	15	5	1	43
Wisconsin	3,106.9	24	36	4	10
Wyoming	494.1	41	1	3	46
U.S. Total	259,654.1	—	890	338	—

SOURCES: The Nation's Public Works: Report on Hazardous Waste Management, by Apogee Research, Inc. for the National Council on Public Works Improvement; U.S. Environmental Protection Agency, National Facilities List, July, 1988.



GROWTH IN HIGHWAY TRAVEL



HIGHWAYS

In 1989, Americans will travel more than 2 trillion vehicle miles by auto, truck, bus, and public transit systems, more than triple the mileage traveled in 1956. From 1980 through 1988, traffic growth has increased at an average rate of 5 percent annually. Using conservative estimates of only 2-3 percent annual growth, by the year 2005 highway travel is expected to top 3 trillion vehicle miles, and by the year 2020—only thirty years into the future—total travel in the U.S. is expected to be double what it is today.

America's population will increase by 44 million over the next 30 years. Nearly 90 percent of America's population growth in the 1980s has occurred in metropolitan areas. Three-quarters of the 250 million trips made each day are in metropolitan areas, and over 80 percent of these trips are made in private motor vehicles.

As a result of substantial growth in travel, America's major highway systems in both rural and urban areas have experienced increasing congestion. Urban interstate travel increased 13.4 percent from 1985 to 1987, with other urban freeway and expressway traffic increasing 12.9 percent during the same two-year period. The percent of peak hour travel on urban interstates that occurs under congested conditions has increased from 54 percent in 1983 to 61 percent in 1985 and to 65 percent in 1987.

Travel delays in the nation's largest urbanized areas now cause nearly 2 billion hours of time to be lost annually. A Department of Transportation study has estimated that by the early 21st century, delays are likely to be several times greater than they are today.

A 1983 Federal Highway Administration Study indicated that 11 percent of all labor force work hours are spent on the highways. Obviously, a 10 percent—or greater—reduction in their travel times could have a marked effect on national productivity. The reverse is also true; increases in travel time are having a negative impact on the productivity of the nation's industries.

FHWA statistics show that over 11 percent of principal highway miles are deficient, and are therefore in need of resurfacing or reconstruction. By 1990, 35 percent of the interstate system will have outlived its design life. Most of the highway system was not designed to carry current loads, and a single, modern 80,000 pound truck can inflict as much wear and tear on an interstate highway as 9,600 cars.

Operating costs are closely correlated with pavement condition. Truck costs shoot up by 6.3 cents per mile when road conditions drop from "good" to "fair". Continuing current levels of highway funding will result in further deterioration of the highway system, resulting in an estimated \$1,000 increase in vehicle operating costs per household. The relationship fortunately works the other way as well. Every \$1 invested in highways reduces direct operating costs by \$3 to \$4.

HIGHWAY TRAVEL
(MILLIONS OF VEHICLE MILES TRAVELED)

<u>State</u>	<u>1985</u>	<u>1987</u>	<u>PERCENT CHANGE (85-87)</u>
Alaska	35,091	37,426	6.7
Alabama	3,840	3,900	1.6
Arizona	21,580	31,729	47.0
Arkansas	17,112	18,308	7.0
California	207,600	228,301	9.0
Colorado	26,146	28,966	3.1
Connecticut	22,152	28,775	20.9
District of Columbia	5,365	6,080	13.4
Delaware	3,223	3,366	4.5
Florida	88,056	93,839	6.3
Georgia	53,713	60,293	12.3
Hawaii	6,762	7,218	6.7
Idaho	7,710	8,119	5.3
Illinois	70,844	75,756	6.9
Indiana	40,782	44,122	8.2
Iowa	20,191	20,808	3.1
Kansas	19,275	20,561	6.7
Kentucky	28,520	30,320	6.3
Louisiana	33,365	30,599	-8.3
Maine	9,277	10,766	16.1
Maryland	33,337	36,493	9.5
Massachusetts	39,696	42,305	6.6
Michigan	67,402	75,706	12.3
Minnesota	32,688	35,167	7.6
Mississippi	19,130	20,173	5.5
Missouri	39,284	43,379	10.4
Montana	7,572	8,074	6.6
Nebraska	12,054	13,091	8.6
Nevada	7,566	8,396	11.0
New Hampshire	7,538	9,167	21.0
New Jersey	53,108	57,071	7.5
New Mexico	13,269	15,116	13.9
New York	90,518	98,002	8.3
North Carolina	49,923	54,800	9.4
North Dakota	5,387	5,681	5.5
Ohio	75,549	79,157	4.8
Oklahoma	31,181	31,806	1.4
Oregon	21,456	23,332	8.7
Pennsylvania	75,428	78,626	4.2
Rhode Island	5,823	6,003	3.1
South Carolina	26,677	30,224	13.3
South Dakota	6,277	6,209	-1.1
Tennessee	36,256	42,126	16.2
Texas	143,263	151,186	5.5
Utah	12,037	12,679	5.3
Vermont	4,688	5,039	7.5
Virginia	47,928	54,834	14.4
Washington	34,375	38,520	12.1
West Virginia	12,664	13,742	8.5
Wisconsin	36,679	40,196	9.6
Wyoming	5,401	5,367	-0.6
U.S. TOTAL	1,774,782	1,824,327	8.4

SOURCE: Federal Highway Administration

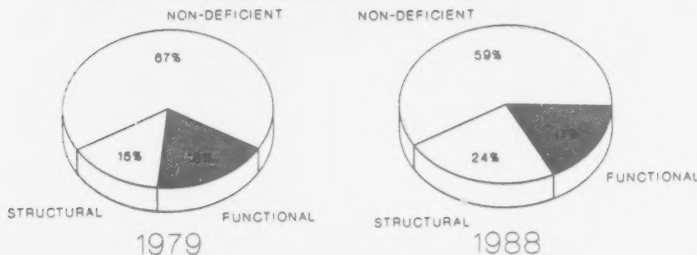


THE NATION'S DETERIORATING HIGHWAYS

State	*Principal Highway Miles	Deficient Miles	Percent Deficient	Rank
Alabama	29507	5650	20	9
Alaska	5156	1274	25	5
Arizona	15141	1418	9	25
Arkansas	27333	3970	15	12
California	57831	5337	9	25
Colorado	27521	1499	5	40
Connecticut	6898	460	7	32
Delaware	1566	168	11	21
D.C.	435	46	11	21
Florida	29612	2621	10	23
Georgia	36619	4247	12	19
Hawaii	1484	191	13	16
Idaho	12967	2216	17	10
Illinois	36376	1608	4	42
Indiana	30897	4786	15	12
Iowa	42008	1196	3	46
Kansas	43126	3431	8	29
Kentucky	23106	3232	14	14
Louisiana	18300	2340	13	16
Maine	8647	549	6	37
Maryland	9026	380	4	42
Massachusetts	12799	1005	8	29
Michigan	41236	2558	6	37
Minnesota	42152	422	1	51
Mississippi	23053	7964	35	2
Missouri	35419	6071	17	10
Montana	23175	2054	9	25
Nebraska	29417	1189	4	42
Nevada	8096	590	7	32
New Hampshire	4592	1071	23	6
New Jersey	10692	1318	12	19
New Mexico	11841	966	8	29
New York	36229	1010	3	46
North Carolina	29921	2226	7	32
North Dakota	25202	726	3	46
Ohio	34866	3245	9	25
Oklahoma	34547	8479	25	4
Oregon	25049	3441	14	14
Pennsylvania	34878	7324	21	8
Rhode Island	1754	451	26	3
South Carolina	21044	1158	6	37
South Dakota	25253	1623	7	32
Tennessee	26616	9672	36	1
Texas	90780	6670	7	32
Utah	11916	320	3	46
Vermont	4685	254	5	40
Virginia	22633	2397	10	23
Washington	23627	1031	4	42
West Virginia	12246	2659	22	7
Wisconsin	33278	4198	13	16
Wyoming	14660	437	3	46
U.S. Total	1,212,230	129,546	11	—

*These figures represent approximately 30 percent of the Nation's total highway mileage which carries 87% of all travel.
SOURCE: Fed. Hwy Administration, U.S. Dept. of Transportation

U.S. DEFICIENT BRIDGES



SOURCE: FEDERAL HIGHWAY ADMINISTRATION

Recently the American Association of State Highway and Transportation Officials conducted a comprehensive study of the future capital needs of the nation's surface transportation systems. In their final report entitled *The Bottom Line: A Summary of Surface Transportation Investment Requirements 1988-2020*, AASHTO estimated annual capital investment requirements of \$58.5 billion to meet future highway transportation needs. This compares with current annual expenditures by all levels of government of \$31.0 billion.

Currently federal, state and local governments spend 3.2 cents per vehicle mile to fund the capital, maintenance and operation expenses for the nation's highway system. Compared with the cost of owning and operating an intermediate sized vehicle, which is currently estimated at 33.4 cents per mile, expenditures on highway infrastructure represent less than 10 percent of vehicle costs. An additional 1.1 cent per mile investment would be enough to fund the current capital investment shortfall, both improving pavement conditions and financing new highways to meet growing population needs.

BRIDGES

Inadequate bridges are one of the nation's most pressing infrastructure problems. Over 41 percent of the 577,710 bridges in the 1988 National Bridge Inventory are either structurally deficient or functionally obsolete. A structurally deficient bridge is one that must be replaced. A functionally obsolete or deficient bridge is one that cannot handle modern traffic loads safely, and either widening or replacement is required.

As of June, 1988, 238,357 bridges were deficient for either structural or functional reasons, a slight 2 percent improvement from the 243,846 bridges rated inadequate in 1986. The tremendous backlog of bridges needing replacement and rehabilitation, along with estimated needs to meet growth, will require an investment

of \$93 billion between now and the year 2005 as estimated by the Federal Highway Administration.

The number of structurally deficient bridges increased to 135,826 in June of 1988 from 131,562 in 1986. The number of functionally obsolete bridges decreased from 112,084 in 1986 to 102,531 in 1988; part of the decline was the further deterioration of functionally obsolete bridges due to aging and heavy traffic, causing them to be moved to the structurally deficient category.

Bridge conditions on the most heavily-trafficked highways have generally deteriorated. The proportion of Interstate bridges classified as deficient rose from 10.6 percent in 1982 to 13.1 percent in 1984, to 14.3 percent in 1986, and to 15.9 percent in 1988.

Of the total \$93 billion in bridge needs, \$67.6 billion is needed to eliminate backlog and existing deficiencies; the remaining \$25.3 billion is necessary for accruing needs to the year 2005. The federal government should be expending a minimum of \$3.5 billion annually through 2005 simply to rebuild and replace deteriorated bridges; to meet ongoing needs and support the growth in population, a minimum of \$4.9 billion should be spent each year.

At the present time, and for a number of years, the federal government has been spending less than one-third of the minimum \$3.5 billion needed to preserve and provide safe bridges. According to Secretary of Transportation Samuel Skinner, the required repair and replacement of highway bridges in this country will cost two-thirds as much as the original construction of the interstate system.

AIR TRANSPORTATION

The air transportation system is an increasingly important segment of the infrastructure, now accounting for 17.2 percent of all intercity passenger miles traveled. In 1988, U.S. scheduled airlines carried 454.6 million passengers over 423 billion passenger miles on



THE NATION'S DEFICIENT BRIDGES

State	Total Bridges	Structurally Deficient	Functionally Obsolete	Total Deficient	Percent Deficient	Rank
Alabama	15,534	3949	3602	7551	49	13
Alaska	800	86	27	111	14	45
Arizona	5623	180	252	412	7	51
Arkansas	13017	1586	4225	5821	45	17
California	22261	1666	4055	5721	26	37
Colorado	7426	2206	480	2686	36	27
Connecticut	3749	2394	1368	2401	64	2
D.C.	237	46	1	49	21	39
Delaware	736	79	96	175	24	43
Florida	10188	610	1605	2215	22	41
Georgia	14226	3520	2518	6038	42	21
Hawaii	1043	115	161	276	26	37
Idaho	3745	580	514	1074	29	33
Illinois	25428	5313	2042	7355	29	33
Indiana	17517	3807	3939	7666	44	19
Iowa	25665	6040	6336	12376	48	15
Kansas	25648	5386	7347	12733	50	12
Kentucky	12591	2207	5252	7459	59	5
Louisiana	14139	3959	2443	6402	45	17
Maine	2583	436	331	767	30	32
Maryland	4574	703	1189	1872	41	23
Massachusetts	4964	1714	209	1923	39	26
Michigan	10561	2628	683	3311	31	31
Minnesota	12994	1911	1787	3698	28	35
Mississippi	16994	8421	2563	8984	53	10
Missouri	23682	12347	2718	15065	64	2
Montana	4632	495	2240	2735	59	5
Nebraska	15843	7636	1158	8794	56	8
Nevada	1073	50	109	159	15	48
New Hampshire	2572	522	603	1125	44	19
New Jersey	5997	1352	752	2104	35	28
New Mexico	3439	410	334	744	22	41
New York	17326	10409	1403	11812	68	1
North Carolina	16115	1107	7382	8489	53	10
North Dakota	5283	1969	582	3041	58	7
Ohio	29180	4494	1504	5998	21	43
Oklahoma	22961	8229	4677	12906	56	6
Oregon	6608	577	558	1135	17	47
Pennsylvania	22457	5960	2917	8867	40	24
Rhode Island	702	96	36	136	19	46
South Carolina	6666	939	836	1775	20	45
South Dakota	6622	1660	1530	3190	47	16
Tennessee	16647	4366	3023	7389	40	24
Texas	44314	6572	8581	15153	34	29
Utah	2543	282	96	358	14	49
Vermont	2665	503	808	1311	49	13
Virginia	12652	3933	1610	4284	34	29
Washington	6696	920	941	1861	27	36
West Virginia	6513	2795	1196	3991	61	4
Wisconsin	12963	3976	1455	5433	42	21
Wyoming	2626	320	356	676	24	39
U.S. TOTAL	577,710	136,826	102,531	239,357	41	—

SOURCE: Federal Highway Administration, U.S. Department of Transportation

6.7 million flights. Although 66 percent of all Americans over the age of 18 have flown on a commercial airline, the majority of these miles are flown by business travelers, and the air transportation network is crucial to both management of industry and service enterprises. Revenue passenger miles flown have increased on average by 8.9 percent annually over the past ten years, severely straining the capacity of the nation's air transport system.

The Federal Aviation Administration is forecasting a 5.0 percent annual growth rate in the number of revenue passenger miles flown by major air carriers from 1988 through the year 2000. Commuter and regional airlines are expected to grow even faster, increasing their revenue passenger miles flown at an annual rate of 8.7 percent through the turn of the century.

As air travel continues to grow at this rapid pace, the Federal Aviation Administration estimates that the number of "seriously congested" airports will increase to 58 by the year 2000, having an impact on 76 percent of all passengers. This is a substantial increase from the current congested conditions. In 1986, the FAA calculated that 16 commercial service airports met the "very congested" criteria, having an impact on the 41 percent of all air passengers whose routes took them through these 16 airports.

In September, 1989 the Federal Aviation Administration awarded a \$60 million grant to Denver, Colorado, taking a large step forward in the process of constructing the first new major airport in 15 years. The airport, which has been under review for two years, will be built on a 53-square mile site 18 miles northeast of Denver. The new Denver airport is expected to begin operation in 1993 with five runways, and plans are in the works to expand the airport to 12 runways by the year 2020.

The new Denver airport should handle 817,000 take-offs and landings and board 33.2 million passengers by the year 2000. The current airport, Stapleton International, frequently only operates with one runway during inclement weather, causing backups throughout the nation's air traffic system.

Secretary of Transportation Samuel Skinner has commented, "It's a national embarrassment that we've had no new airport in the U.S. since 1974," estimating a need for a 55 percent increase in airport capacity by the turn of the century.

Airport capacity expansion needs have been computed by the Federal Aviation Administration as part of the National Plan of Integrated Airport Systems (NPIAS). Although some construction has occurred since the NPIAS plan was published, the vast majority of these aviation needs remain backlogged. The assessed needs break down as follows:

Increase Capacity and Expand System—
\$17.4 billion
Update and Improve System—\$4.3 billion
System Maintenance—\$2.6 billion

AIRPORTS: CONGESTION CAUSES DELAYS

Airport	Increase in Time Spent On Runway Over Last 10 Years
Dallas/Ft. Worth	+ 104.4%
Washington Dulles	+ 97.9%
San Francisco	+ 95.8%
Minneapolis/St. Paul	+ 87.1%
Raleigh/Durham	+ 86.8%
Phoenix	+ 82.1%
Cincinnati	+ 60.0%
Los Angeles	+ 58.1%
Seattle	+ 52.9%
Baltimore	+ 52.5%

Source: Federal Aviation Administration

PORTS AND WATERWAYS

U.S. ports and waterways are integral to the transportation of the goods produced and used by America's agricultural sector, industries, and consumers. In 1988, international shipments rose 16 percent. The value of exports increased by 50 percent over the three-year period from 1985 to 1988; the value of imports rose 28 percent.

The U.S. has 188 deep draft U.S. ports located along the Atlantic, Gulf, Pacific, and Great Lakes coasts. In addition, deep-draft navigation on the Great Lakes—St. Lawrence Seaway System requires a series of 16 locks, with 23 separate chambers, and connecting channels. Taken together, the U.S. inland waterway navigation system carries about one-third of total U.S. waterborne tonnage (foreign and domestic).

Expansion and modernization of the nation's ports and waterways will require investment in a number of projects. On the inland waterway system, a number of locks and chambers are so old that they require major rehabilitation or replacement. For seaports, modernization is necessary to achieve transportation cost savings for a number of ports with depths of less than 50–55 feet. The Water Resources Development Act of 1986 and 1988 authorized over 38 projects which should be constructed to deepen and/or widen channels in these ports, at a total cost of over \$2.7 billion.

Over the last 15 years there has been an increase in the size of vessels involved in waterborne commerce. In 1980, about 35 percent of vessels exceeded 10,000 dead weight tons (dwt). As of 1987, over 60 percent of the active tonnage in the world tanker fleet exceeded 10,000 dwt. These vessels need channels that are deeper than 50 feet. However, there are no harbors on the U.S. Atlantic and Gulf coasts which have depths capable of handling a fully loaded vessel of that size; no harbor currently exists with a depth greater than 45 feet. Only the Pacific Coast harbors of Los Angeles/Long Beach and some of the ports at Puget Sound have depths of 55 to 60 feet.



AIRPORT CAPACITY EXPANSION NEEDS (In Millions)

State	1986-1990	1991-1995
Alaska	\$455.9	\$126.6
Alabama	114.6	74.0
Arizona	168.3	131.5
Arkansas	65.2	34.8
California	1,086.6	534.8
Colorado	451.6	3,376.9
Connecticut	27.5	30.7
D.C.	156.2	370.3
Delaware	10.0	3.0
Florida	959.9	395.2
Georgia	450.6	315.8
Hawaii	106.2	71.2
Idaho	28.1	48.7
Illinois	885.1	300.6
Indiana	289.9	161.5
Iowa	166.9	39.3
Kansas	202.9	72.9
Kentucky	76.3	62.7
Louisiana	176.2	232.0
Maine	34.4	23.8
Maryland	49.3	20.6
Massachusetts	90.5	59.1
Michigan	829.5	371.8
Minnesota	319.9	96.7
Mississippi	63.9	38.5
Missouri	306.9	231.2
Montana	57.0	34.1
Nebraska	130.7	46.0
Nevada	138.3	142.3
New Hampshire	13.8	14.2
New Jersey	192.3	138.8
New Mexico	121.1	46.8
New York	2,078.2	522.1
North Carolina	211.5	83.7
North Dakota	51.2	60.6
Ohio	405.9	202.3
Oklahoma	115.2	73.0
Oregon	91.5	71.1
Pennsylvania	411.9	433.4
Rhode Island	23.8	12.9
South Carolina	83.2	66.4
South Dakota	71.1	18.6
Tennessee	195.7	107.0
Texas	1,151.8	814.6
Utah	119.8	93.4
Vermont	13.5	16.0
Virginia	89.6	33.7
Washington	150.1	141.8
West Virginia	42.4	5.8
Wisconsin	216.3	56.0
Wyoming	77.2	26.8
U.S. TOTAL	\$13,805.7	\$10,515.8

Source: Federal Aviation Administration, National Plan of Integrated Airport Systems

The driving force behind the need to service large vessels is the cost savings achieved by use of larger vessels. A transportation cost savings of \$3 to \$5 per ton for trips from the U.S. Atlantic coast to Europe can be achieved, with much greater savings for trips to the Far East. The Office of Technology Assessment has estimated that 10 percent can be cut from the cost of export coal as received by Europe and the Pacific Rim countries if U.S. ports could handle super-colliers. A Congressional Budget Office report has noted that it would appear cost-effective to dredge one or two ports to 55 feet.

CONCLUSION

America's infrastructure investment must be protected and expended—not just because it's necessary for our health and safety—not just because it's for the prosperity of the economy—not just because it's vital to our world competitiveness—not just because it's essential to our continued growth as a nation. It's critical to the quality of our lives and to our continued faith in our government and ourselves as a great nation.

Innovative and equitable infrastructure initiatives are required. The task will require a strong partnership among the federal government, states, cities, counties, other governmental units, and the private sector. All must maintain their fiscal support for infrastructure programs, and seek new ways to make progress on many fronts, including capital planning, creative funding strategies, improved management, and technological innovation. Although the nation must address the federal budget's imbalance, the country cannot afford to ignore the crucial role that public works play in a vital economy. The long-range impact on the nation of not going forward today with vital infrastructure projects is shortsighted. Infrastructure must be a top national priority, and to resolve the crisis in the nation's public works:

- Investment in infrastructure must be increased.
- All levels of government must take steps to encourage innovative technology, financing, and public/private partnerships.

Legislative goals to meet those objectives:

- There should be no further funding reductions of existing federal programs that address infrastructure needs.
- The existing federal infrastructure trust funds must be continued, adequately funded, and fully expended for their intended purposes.
- Federal restrictions on the use of tax-exempt financing for infrastructure purposes should be eliminated.
- A federal capital infrastructure program should be created to provide assistance to states and localities in meeting infrastructure needs.
- A federal long-term multi-year capital budget should be established.

Rebuild America is a broad coalition of public and private organizations committed to the infrastructure challenge. Its Chairman is Mayor Terry Goddard, President of the National League of Cities and Mayor of Phoenix, Arizona. It includes the mayors, city councilmen and other public leaders whose job it is to maintain, inspect, and plan for the building and rebuilding of our public facilities. They are supported by the engineers, builders, financiers, contractors, and architects whose careers are dedicated to the highest standards of quality, safety, and cost effectiveness.

STEERING COMMITTEE:

American Consulting Engineers Council
American Institute of Architects
American Public Works Association
American Society of Civil Engineers
Associated General Contractors of America
Council of State Governments

National Association of Counties
National Association of Home Builders
National League of Cities
Public Securities Association
U.S. Conference of Mayors

MEMBERS:

The Airport Consultants Council
American Association of Port Authorities
American Concrete Institute
American Concrete Pavement Association
American Concrete Pipe Association
American Congress of Surveying and Mapping
American Institute of Steel Construction
American Planning Association
American Public Power Association
American Society of Landscape Architects
American Society of Mechanical Engineers
American Subcontractors Association
American Water Works Association
Associated Builders and Contractors
Association of Local Housing Finance Agencies
Better Roads and Transportation Council
Council of State Community Affairs Agencies
Edison Electric Institute
Highway Users Federation for Safety and Mobility
International Bridge, Tunnel & Turnpike Association
Mechanical Contractors Association of America, Inc.

National Aggregates Association
National Asphalt Pavement Association
National Association of Housing and Redevelopment Officials
National Association of Regional Councils
National Association of Surety Bond Producers
National Electrical Contractors Association
National Erectors Association
National Ready Mixed Concrete Association
National Roofing Contractors Association
National Society of Professional Engineers
National Stone Association
National Utility Contractors Association
National Waterways Conference
Portland Cement Association
The Privatization Council
Sheet Metal and Air Conditioning Contractors' National Association
The Surety Association of America
Water Pollution Control Federation

101ST CONGRESS
2D SESSION

S. 2046

To establish a National Infrastructure Council, and for related purposes.

IN THE SENATE OF THE UNITED STATES

JANUARY 31 (legislative day, JANUARY 23), 1990

Mr. BURDICK (for himself, Mr. MOYNIHAN, Mr. BAUCUS, Mr. LAUTENBERG, Mr. WARNER, Mr. MITCHELL, Mr. BENTSEN, Mr. REID, Mr. LIEBERMAN, and Mr. BREAUX) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To establish a National Infrastructure Council, and for related purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 SECTION 1. This Act may be cited as the "National
4 Infrastructure Council Act of 1990".

5 SEC. 2. DEFINITIONS.—

6 (a) The term "Federal agency" means any department,
7 agency, or independent agency of the Federal Government,
8 or any instrumentality of the Federal Government, including
9 any corporation owned or controlled by the Federal Govern-
10 ment.

1 (b) The term "infrastructure" includes the following:

2 (1) highways; roads; streets; bridges; and appurte-
3 nances to the above items;

4 (2) shoreline erosion protection facilities;

5 (3) navigation channels and facilities;

6 (4) ports and harbors;

7 (5) flood protection structures;

8 (6) water collection, treatment, and distribution
9 facilities;

10 (7) sewage and drainage facilities;

11 (8) solid waste disposal facilities;

12 (9) hazardous waste disposal facilities;

13 (10) airports and airport facilities; and

14 (11) mass transportation, railroad, and intermodal
15 transportation facilities.

16 (c) The term "local government" means a county, city,
17 town, village, or other general purpose political subdivision of
18 a State.

19 (d) The term "small disadvantaged unit of local govern-
20 ment" means a unit of local government with a population of
21 less than fifty thousand and which has an impaired ability to
22 obtain financing, based on its assets, tax base, bond rating,
23 the absence of a bond rating, or other financial factors which
24 the Council deems appropriate.

1 (e) The term "State" means a State of the United
2 States, the District of Columbia, the Commonwealth of
3 Puerto Rico, the United States Virgin Islands, the Common-
4 wealth of Guam, and American Samoa; or an instrumentality
5 thereof.

6 (f) The term "technical assistance" includes statistical
7 and other studies and compilations, technical tests and eval-
8 uations, plans, engineering and design information and eval-
9 uations, technical information, financing information, legal
10 assistance, and training activities.

11 SEC. 3. NATIONAL INFRASTRUCTURE COUNCIL.—

12 (a) There is hereby established the National Infrastruc-
13 ture Council (hereinafter referred to as "Council"), to be
14 composed of the following members or their designated repre-
15 sentatives:

- 16 (1) the Secretary of the Army;
17 (2) the Secretary of the Interior;
18 (3) the Secretary of Transportation;
19 (4) the Secretary of Commerce; and
20 (5) the Administrator of the Environmental Pro-
21 tection Agency.

22 (b) The President shall appoint the Chairperson of the
23 Council from among the designated members.

24 (c) The Chairperson of the Council shall request the
25 heads of other Federal agencies to participate with the Coun-

1 cil when matters affecting their responsibilities are considered
2 by the Council.

3 (d) POWERS AND DUTIES.—The Council shall—

4 (1) develop and coordinate Federal infrastructure
5 policy, evaluate roles for public and private entities in
6 implementing this policy, and propose actions neces-
7 sary to carry out the policy;

8 (2) prepare an assessment of national infrastruc-
9 ture needs and priorities on an annual basis;

10 (3) establish guidelines and procedures for the co-
11 ordination and provision of Federal assistance to States
12 and local governments on all infrastructure matters. In
13 establishing such guidelines and procedures, the Coun-
14 cil shall consider the findings of the study to be con-
15 ducted pursuant to section 408 of this title;

16 (4) develop priorities and recommendations for
17 Federal infrastructure investments to be undertaken
18 based upon the needs assessment and application of the
19 guidelines and procedures developed pursuant to sub-
20 section (d)(3) of this section;

21 (5) transmit its priorities and recommendations to
22 the President and the Congress.

23 (e) ADMINISTRATIVE PROVISIONS.—For the purpose of
24 coordinating Federal infrastructure policy, preparing needs
25 assessments, developing guidelines and procedures, and exe-

1 cutting the responsibilities vested in it by this Act, the Council
2 shall—

3 (1) hold such hearings, sit and act at such times
4 and places, take such testimony, receive such evidence,
5 and print or otherwise reproduce and distribute so
6 much of its proceedings and reports as it may deem
7 advisable;

8 (2) acquire, furnish, and equip such office space as
9 is necessary;

10 (3) use the United States mails in the same
11 manner and upon the same conditions as other depart-
12 ments and agencies of the United States;

13 (4) employ and fix the compensation of such per-
14 sonnel as it deems advisable, in accordance with the
15 civil service laws and chapter 51 and subchapter III of
16 chapter 53 of title 5 of the United States Code;

17 (5) procure services as authorized by section 3109
18 of title 5, at rates not in excess of the daily equivalent
19 of the rate prescribed for grade GS-18 under section
20 5332 of title 5 of the United States Code in the case of
21 individual experts or consultants;

22 (6) purchase, hire, operate, and maintain passen-
23 ger motor vehicles; and

1 (7) incur such necessary expenses and exercise
2 such other powers as are consistent and reasonably re-
3 quired to perform its functions.

4 (f) To the extent permitted by law, all appropriate
5 records and papers of the Council may be made available for
6 public inspection.

7 (g) Upon the request of the Council, the head of any
8 Federal department or agency is authorized—

9 (1) to furnish to the Council such information as
10 may be necessary for carrying out its functions and as
11 may be available to or procurable by such department
12 or agency, and

13 (2) to detail to temporary duty with such Council
14 on a reimbursable basis such personnel within its ad-
15 ministrative jurisdiction as it may need or believe to be
16 useful for carrying out its functions, each such detail to
17 be without loss of seniority, pay or other employee
18 status.

19 (h) The Council shall be responsible for—

20 (1) the appointment and supervision of personnel,

21 (2) the assignment of duties and responsibilities
22 among such personnel, and

23 (3) the use and expenditures of funds.

1 (i) There are authorized to be appropriated to the Coun-
2 cil \$5,000,000 for fiscal year 1991 and for each succeeding
3 fiscal year to carry out the purposes of this section.

4 SEC. 4. INFRASTRUCTURE ASSISTANCE PROGRAM.—

5 (a) For the purposes of furnishing assistance to State
6 and local governments, the Council shall implement the In-
7 frastructure Assistance Program.

8 (b) The Council shall establish procedures to coordinate,
9 receive, and channel requests for assistance and information
10 on infrastructure and infrastructure technology;

11 (c) The Council shall consult with appropriate Federal
12 agencies, non-Federal and private entities on developing a
13 program of infrastructure assistance;

14 (d) The Council shall establish administrative require-
15 ments necessary to carry out the provisions of this title;

16 (e) The Council shall prepare and submit an annual
17 report to the Congress on the effectiveness of the programs
18 established in this title.

19 SEC. 5. TECHNICAL ASSISTANCE PROGRAM.—

20 (a) the Council is directed to establish a program to pro-
21 vide technical assistance upon the request of States and local
22 governments for such assistance regarding the construction,
23 improvement, rehabilitation, operation, or maintenance of in-
24 frastructure. In carrying out this program the Council is

1 authorized to use the resources and facilities of Federal
2 agencies.

3 (b) The non-Federal share of the costs of assistance pro-
4 vided under this section shall be 25 per centum; except that
5 assistance to a small disadvantaged unit of local government
6 shall be provided at full Federal expense.

7 (c) There are authorized to be appropriated \$5,000,000
8 for fiscal year 1991, and for each succeeding fiscal year to
9 carry out the purposes of this section.

10 SEC. 6. TECHNOLOGY TRANSFER ASSISTANCE PRO-
11 GEAM.—

12 (a) The Council is authorized, in consultation with the
13 National Technical Information Service, to provide a clear-
14 inghouse of requests from States and local governments, in-
15 dustrial organizations, public and private foundations, non-
16 profit organizations, or other persons, for technology pro-
17 grams and research and development programs relating to
18 infrastructure.

19 (b) The Council shall refer the requests and inquiries
20 directly to the appropriate Federal agency for response.

21 (c) There are authorized to be appropriated \$1,000,000
22 for fiscal year 1991, and for each succeeding fiscal year to
23 carry out the purposes of this section.

24 SEC. 7. RESEARCH AND DEVELOPMENT PROGRAM.—

1 (a) The Council is authorized to carry out a five-year
2 program to promote the use of innovative technology in the
3 design, construction, improvement, rehabilitation, use, oper-
4 ation, and management of infrastructure. In carrying out the
5 program, the Council is authorized to determine appropriate
6 projects to undertake, and designate Federal agencies to
7 carry out a project constructed pursuant to this program.

8 (b) Projects constructed pursuant to this program shall
9 be at full Federal expense.

10 (c) There are authorized to be appropriated
11 \$20,000,000 to carry out the purposes of this program.

12 SEC. 8. (a) The Council is directed to conduct a study to
13 determine the value and worth of infrastructure, and to de-
14 velop and recommend alternative economic processes to de-
15 termine the feasibility and viability of Federal infrastructure
16 projects. In preparing this study the Council shall consider
17 alternatives to traditional cost-benefit analyses.

18 (b) The Council shall report to the Congress on the re-
19 sults of its findings within one year after the date of enact-
20 ment of this Act.

21 (c) There are authorized to be appropriated \$1,000,000
22 for fiscal year 1991 to carry out the purposes of this section.

○